PSYCHOLOGY FOR EVERYONE

AN OUTLINE OF GENERAL PSYCHOLOGY

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Dedication

TO

MY MOTHER

PREFACE

THIS book is meant for the general public. No previous knowledge of Psychology is assumed. All that is required for its understanding is an interest in human nature.

But why should one read a book on Psychology ? After all, it might be argued : Every man is his own psychologist. We all have to be psychologists in so far as we have to deal with our fellow-men, and by far the greater part of our time is occupied in so doing. Some of us are better at it than others, just as some people are " born " cooks ; but just as a cook need not be a chemist to make a satisfactory *soufflé*, so, surely, a man who knows how to deal with other men need not be a psychologist in the academic sense.

This is true, but it is not the whole truth. When we are dealing with other human beings we are engaged in a task far more complicated than the one which confronts the cook when she is making her *soufflé*. The object we are " handling " is one about which we must ponder and reflect, which we have to analyse and examine carefully, and which constantly dismays us by its unexpected behaviour.

We ourselves, too, are involved in the situation, our prejudices blur our vision, our interests and desires undermine our judgment, and we feel ourselves in need of some more general information about how people work than we could possibly obtain from our own experience.

It is this need that Psychology sets out to meet. But there is a difficulty at the outset. There seems not to be one Psychology but many Psychologies, and the bewildered

reader passes from one authority to another, being told a different story by each. He feels in need of a guide which will help him to understand what the varying authorities are up to, why they differ, and what their differences signify.

It is this need that I am trying to meet in the pages that follow. The academic psychologist naturally starts from a rather different position from that occupied by the naïve psychologist of everyday life ; he tries to treat his subject, man, as objectively as possible, just as if he were a rat or a piece of iron, and to express the behaviour of that subject in terms of some framework or other, which enables him to co-ordinate what he observes, and to present a coherent picture. I have tried in this book to convey the standpoint of the academic psychologist, to explain what sort of questions he asks, and how he tries to answer them.

I am not an adherent of any " School " of Psychology, and I have concentrated on explaining the problems which all schools have to face, the ways in which they differ in their suggestions, and the special contributions which each group of theorists have made.

I have cast my net as widely as possible, at the risk of a somewhat compact treatment of certain parts of the field, because I believe that all students of Psychology must have their eyes on all the corners of the total field of human behaviour at once. It is quite useless to formulate a theory which is adequate to " explain " something you have discovered in one area, but which is inadequate when tested out somewhere else.

It looks as though people worked on several gears ; part of our behaviour seems automatic, part seems a " matter of habit," but varies from time to time to meet the special circumstances of the moment, and part of it seems to involve understanding and " reason." If you concentrate on the automatic behaviour you will find plenty

of evidence for the " machine " type of theory, but when you try to apply such a theory to what happens when we *think*, you soon discover that it will not do. We shall find that there is much to be said for all theories, *with respect to the areas which they cover*, but that so far there is no grand theory which covers the whole field of enquiry.

The plan of the book is as follows : In Chapters I to X I have dealt with the dynamics of the organism—what makes the wheels go round, what happens when our desires conflict with one another, what growing up consists of, and to what diseases our minds are liable when something has gone wrong. In Chapters XI to XIX I have given the important data, which research has revealed, with respect to the way in which our senses are affected by the outside world, and the way in which we remember and imagine what is no longer before us, and what we are never likely to see. In Chapters XX and XXI I have described the " higher mental processes " of *belief* and *thought*, in many ways the most important, and the most difficult part of the study of mankind, while in the last chapter I have discussed the questions which centre round the problem of the relation of our bodies to our minds.

I have tried to convey the standpoint of the psychologist, not only in the hope that it may be useful in private intercourse, and interesting to those who enjoy reflecting on human nature, and its infinite oddity, but also because I believe that our more serious problems—world problems, social problems, problems of moral education, and suchlike—will only be solved if we become " psychology-minded." We are usually far too busy telling the world how people *ought* to behave, and throwing up our hands in horror when they disappoint us, whereas a little quiet observation would show us that there is no earthly reason to suppose that they are made in such a way as to fit in with our plans.

By all means let us discuss what ought to be done, but let us first try to understand the people who have got to do it. We think it " natural " that a cat should " steal " the milk, because we know that that is the kind of thing that cats do, but we are apt to be surprised that a child should steal sixpence, because we think it is the sort of thing that he *ought not* to do. " Ought " and " ought not " are irrelevant to the issue. What we have to discover is how people *do* behave, and not how they *ought* to behave, before we try to make them act in a way of which we approve. It is this concentration on what *is*, and a temporary shelving of what *ought* to be, that I mean by " psychology-mindedness," and it is to further that kind of " -mindedness " that I have made my aim in writing this book.

I should like to take this opportunity of expressing my gratitude to Professor G. E. Moore, Professor F. C. Bartlett, and Dr. C. S. Myers for their personal teaching, to Miss E. Prince for her valuable help, and to Messrs. Kegan Paul for their permission to reproduce Figs. 1, 2, 5 and 6 from Koffka's " Principles of Gestalt Psychology."

W. J. H. SPROTT.

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INTRODUCTION.

THE SCHOOLS OF PSYCHOLOGY.

PSYCHOLOGY is said to be a difficult subject, and so indeed it is, when we consider its subject-matter. What more complicated object of study than ourselves, and what more unpredictable set of events than the behaviour of our neighbours ? But this is not all that is meant by people who shrink from the study of psychology on account of its alleged difficulty. What they complain of is that there are so many theories of psychology, so many schools, so many "psychologies," all disputing among themselves, and each claiming to be the repository of true doctrine.

There is some truth in the charge, but something can perhaps be done towards a modification of the confusion by a brief examination of what is meant by a "school" of psychology.

We read of the Marburg school, the London school, the Freudian school, the "Gestalt" school, and the "Behaviourists," and in the face of such varieties of doctrine we are liable to give up in despair. The truth, however, is that the classification of psychologists as belonging to this school or that does not always mean the same thing from instance to instance.

(1) The schools are sometimes named after famous teachers : Freudian, Adlerian, Jungian, "K.K.W." (Koffka, Köhler, Wertheimer), etc.

(2) They are sometimes named after places in which research in a particular subject has been done : London, Würzburg, Marburg, Leipzig, etc.

(3) They may be distinguished because of a *general* theory of psychology, or because a new orientation in psychological theory has emerged at a particular place: *e.g.* Leipzig is famous because of Wundt's having been professor there, and because Wundt initiated the reaction against the simple associationists; the " Gestalt " school, the " Behaviourists " (Watson), the " Hormic " school (McDougall), the " Personalistic " school (Stern), all provide alternative frameworks for general psychological theory.

(4) Schools may be distinguished because of some *special* problem which has been investigated by them: *e.g.* the London School (Spearman) is renowned for its work on intelligence, its elaboration of a mathematical technique for dealing with the results of tests in order to find out whether a general factor is operative, and for its work on temperament; the Marburg school (Jaensch) is famous for the work done on eidetic imagery and the application of the discoveries to the theory of perception; the Würzburg school (Külpe) concentrated on the thought processes; the modern Leipzig school (Krüger) concentrates on the developmental aspect of behaviour.

From this brief outline of the principles of classification, it is obvious that the difference of opinion among psychologists can easily be exaggerated if we get it into our heads that there are as many " psychologies " as there are " schools "; a person may concentrate on a particular subject and agree with other psychologists on other subjects or a psychologist may put forward a general theory and try to incorporate the findings of, say the London, or the Marburg " schools " into it.

This is not to say that psychologists do not disagree, but to point out that they do not disagree as much as might be thought, if we take the classification into " schools " too seriously.

The most significant difference between psychologists concerns the direction of their interests to people or to behaviour.

A. Theories of Disposition.

Some psychologists are predominately interested in character, disposition, the *tendency* to do this rather than that, the *purposiveness* of human behaviour, the understanding of *people.*

The explanatory frameworks which they will produce will all be of the same type : they will all speak in terms of interests, desires, tendencies, and such dynamic concepts, because they want a way of talking about people as being *likely* to behave in this way and that, whether they are *actually doing so or not.* For them, a man lying asleep in his bed has, in some sense, the dispositions to behave in all sorts of ways even though he is not manifesting those dispositions at the moment.

Under this heading come the psychologies of Freud, Adler, Jung, McDougall, Stern, and all those who write in terms of urges and drives.

The differences between such psychologists will lie in the nature and aims of the tendencies out of which they construct their pictures.

Freud uses the forces of love and aggression ; *Adler* uses the urge to compensate for inferiority and the urge to seek stability in society ; *Jung* uses a life force, the " libido," of a more general nature ; *Stern* uses the conception of a unique Person, who seeks to express itself ; *McDougall* uses a heterogeneous collection of " instincts " or " propensities."

To this list might be added those " Schools " who postulate super-individual forces : cultural forces, in the case of the students of *Geisteswissenschaft* (Spranger) ; developmental forces in the case of Krüger of Leipzig and those psychologists, *e.g.* Sander and Werner, who are influenced by him.

B. Theories of Reaction.

Other psychologists are more interested in the actual reactions that people make, the actual behaviour as it occurs.

(1) They may be interested in one department: *e.g.* the *Würzburg school* who concentrated on thought processes; the *Associationists* who concentrated on the association of ideas in the mind.

(2) They may be interested in all forms of behaviour, mental and bodily. Here they will differ according to the laws which they postulate: the *Behaviourists* believe in the association of acts by the linking up of nerve paths in series; the *Gestalt* psychologists of the *K.K.W. school* insist on the self-regulating operation of "tension systems" and "configurations" in accordance with internal laws of "wholes" or "Gestalten."

Psychologists who are interested in actual behaviour often use the language of those interested in dispositions when it serves their purpose, and psychologists who are interested in people will use the concepts of the "Gestalt" school when they want to talk about the actual behaviour of a person at any particular time.

This distinction is far more important than the metaphysical differences between psychologists. Freud may believe that ultimately the behaviour of human beings will be re-interpreted in chemical terms, but he wisely uses the concept of tendencies for his formulations; similarly, although the concentration on actual behaviour favours a "physiological" interpretation, it by no means necessitates it.

What, it may be asked, is the sensible attitude to take up when faced with such differences of interest, and differences in theory? The answer is that rather than accept the findings of one "school" at the expense of the others, it is far wiser to accept them all. Man is so complicated that so far we have no one framework which fits all the sides of his nature at once. Each psychologist sees him from a slightly different angle, and emphasises one aspect, and the most helpful line to take up is to try to put oneself in the same position and look at what he is showing one.

After all, the business of every science is to connect one item with another, and produce hypothetical frameworks by means of which the connections are interpreted, and

predictions made. So far there is no universally applicable scheme, and we have to get used to changing the glasses through which we look at human behaviour, in order to achieve the maximum understanding of it that is possible in our present state of ignorance. Of course, where a hypothesis is in disaccord with what we observe, we reject it, either *in toto* or with respect to its adequacy to deal with that aspect of human nature. Psychological theories are not utterances of absolute truth, they are useful devices for understanding. If a theory ceases to be useful, we cast it aside and turn to another ; theories are to be *used* rather than to be believed in.

On these grounds the only satisfactory method for the study of psychology is to develop a certain flexibility which enables us to change our point of view whenever it is convenient to do so.

The subject-matter which lies before the psychologist is exactly the same as that which lies before the layman, and the great service which he can perform is to help us to achieve a more coherent picture of what people are like. At present no one picture satisfies us, and therefore we have to make use of all those that are offered in so far as they are helpful, and hope that some day a synthesis of the contributions that have been made from such diverse points of view will emerge.

CHAPTER I.

THE SPRINGS OF ACTION.

PSYCHOLOGY has been defined as the science of human behaviour. The definition looks harmless enough. It might be objected that psychology should also deal with phenomena that are not " behaviour " in the ordinary acceptation of the term, but such objections can be met with a little ingenuity. It might be urged that " thought," " ideas," " images " and " perceptions " must be discussed ; they must be classified and differentiated ; they are " mental events " and not pieces of behaviour. To this we can reply that they are internal reactions to environment, or internal pieces of behaviour caused by internal processes, and that, as such, they come under the heading of " behaviour " just as much as catching trains or delivering public speeches. By " behaviour " we need not only mean *overt* behaviour, we may include " internal " or " mental " behaviour as well.

The difficulties loom up from an unexpected quarter. Let us confine ourselves to overt behaviour. We talk glibly about a man's reaction to his environment, but when we ask, " what environment ? " we immediately raise philosophical problems which have to be discussed.

The environment of common sense is made up of houses, people, tables, lecture halls, and other things which we see, hear, smell and taste. This is the world in which we behave, and we may call it the " Behavioural World," borrowing the term from Koffka's " Principles of Gestalt Psychology " (1).

A moment's consideration will remind us that the items which make up the behavioural world are the things which we *perceive*, and then we remember that there is another

world—the world of physics—which is supposed to exist independent of our perceptions, and even to be " more real " than the world we actually behave in.

Further consideration still, however, shows us that this world of physics is only known through our perceptions. We measure it with clocks and measuring rods, but what is immediately before us are the marks on the dials, and the notches on the rods. One of the problems of the philosopher is to decide on the status of the world " beyond " the measuring apparatus which is believed by so many people to be more real than the apparatus itself as seen by us.

We see that at the very outset psychology plunges us into metaphysics, and this is a predicament in which we shall constantly find ourselves. The only way out is to make provisional assumptions, bearing in mind that further developments in human knowledge may entail a re-telling of our story.

Let us assume that the world of physics exists, and, still following Koffka, let us call it the " Geographical World." We do not know what it is made of, but we do know that certain calculations which we make about it lead us to correct expectations in the behavioural world, and, because of this, we invent a mathematical scheme which we believe to represent the plan and dynamics of the geographical world.

Now it must be clearly understood that the human body, as a physical thing, belongs to the geographical world, and that, as a physical thing, it obeys the same rules as are obeyed by other physical things. Whether, when we consider the body as a *living* thing, any factor comes in which is not to be found in other physical things which are not living, is a question we can leave unanswered. What we have to bear in mind is that nerves, arteries, blood and kidneys, as physical things, belong to the geographical world ; when we think of them as perceived things, they belong to the behavioural world.

This point has been elaborated because we are apt to regard nerves and muscles as " lying behind " overt behaviour, in the same kind of way that " electrons " are thought

of as " lying behind " perceived things. When we think in this way, we usually have in mind the whitish strands and striated tissue that form part of the content of our perceptions when we look inside a body. When we say that a light ray excites a nerve in the retina, we are liable to have in mind the data presented to the oculist when he looks into the eye. This is, of course, incorrect. The white nerves, the striated tissue and the red retina belong to the behavioural world. When we wish to talk about physical processes acting upon the body we must always remember that they really act on that part of the geographical world which, under suitable circumstances, is calculated to give us a presentation of a retina, a nerve, or whatever it may be.

Now let us consider the behaviour of the organism in the behavioural world. The problem which the psychologist has to solve is this : What scheme of forces can be invented which will serve as a framework by means of which any piece of behaviour can be interpreted ?

Learnt and unlearnt behaviour.—If we study the behaviour of animals, birds and insects, we notice that many of these organisms seem able to behave in fairly complicated ways without being taught by their parents, and without having their own past experience to guide them. Such innate capacities are often denoted by the troublesome word " instinct," but we shall call the activities to which the capacities give rise " instinctive acts." Descriptions of such behaviour can be found scattered about in psychological and biological literature, and it is unnecessary to give examples here.

In his " Outline of Psychology " (2, p. 120), McDougall has defined the capacities, of which we are talking, in the following way : It is " an innate disposition which determines the organism to perceive (to pay attention to) any object of a certain class, and to experience in its presence a certain emotional excitement and an impulse to action which find expression in a specific mode of behaviour in relation to that object." It will be seen that in this definition McDougall is talking about specific modes of behaviour, and it is these

specific modes of behaviour which we are calling "instinctive acts." This is important because a great deal of the confusion in psychological literature which centres round the word "instinct" is due to the fact that sometimes the writer uses the word to denote stereotyped activity, and sometimes to denote the driving forces which we shall come to later on.

There is a problem connected with these instinctive acts which we shall have to face in Chapter IV, but which may be mentioned at this point. Are these responses fixed, or are they modifiable? Is the response as mechanical as the response of a musical box when we put a penny in the appropriate slot, or does it vary with slight variations in the environment to which the response is made? This is one of the battle grounds on which is fought out the struggle between those who see "intelligence" in the "lower" animals, and those who see no such thing.

Now let us look at the behaviour of babies. We see at once that they have very few dispositions of this kind, and on these grounds people have said that human beings have no instincts. Dr. Watson has investigated the question and he has come to the conclusion that babies perform the following instinctive acts on the occasions mentioned within the first thirty days of childhood :—

(1) "If either cheek or the chin is touched lightly with the finger, an infant shortly after birth will move the head in such a way as to bring the mouth in contact with the finger" (Watson, 3, p. 268).

(2) They can grasp an object and support themselves by holding on to it.

(3) They can make defensive movements when the nose is lightly pinched. In this case the reaction is not stereotyped.

(4) They can fixate lights.

(5) When eye and hand co-ordination is achieved they will reach out for objects held in front of them.

(6) Fear responses are elicited by (*a*) dropping from a height, (*b*) loud sounds, (*c*) a push when the child is falling asleep, (*d*) pulling off the blanket when the child is going to

sleep. " The responses are a sudden catching of the breath, clutching randomly with the hands, sudden closing of the eyelids, puckering of the lips, then crying " (3, p. 230).

This is not a complete list of all the responses of children given by Dr. Watson, and he, himself, does not suggest that his own list is complete. Enough examples have been mentioned to remind us of the incapacity of the child with respect to innate tendencies to perform complicated acts. Compared with many insects we are poorly equipped for the battle of life. There are a great many organisms which can fend for themselves as soon as they are born, we, on the other hand, could not do without a considerable amount of assistance.

What, however, we lose in the incompetence of childhood, we make up for in our power of learning by experience. We are able to acquire habits, and apply the results of past experience in a conscious way. Of course animals can do the former, and some of them may be able to do the latter as well, but if one reflects for a moment on one's activities during any day, one sees that they are practically all pieces of behaviour which have been learnt in some sense or another. The learning process will be discussed in Chapter IV.

Having thus distinguished between learnt and unlearnt behaviour, the next thing we have to do is to develop a scheme of driving forces for the behaviour, whether learnt or not. Whenever we are faced with a series of interconnected happenings we have to find some way of coping with their one-after-another-ness.

This has been done in various ways by the psychologists, and it will be convenient to classify their attempts under three headings : (1) Theories of organised common sense, (2) Mechanical reflex theories, (3) Theories connected with the " Gestalt " school.

I. Theories of Organised Common Sense.

When we observe people behaving we immediately tend to ask what *motives* " lie behind " their activities. The answer will contain such dynamic words as : " wish,"

" want," " desire," " urge," or—this time in a new sense—" instinct." We see Mr. Brown coming out of his house dressed in an overcoat and a bowler hat. What is making him act in this way ? He wishes to impress us ; he wants to catch a train ; he is activated by a desire to conform with the members of his social groups by taking a walk in the park at the appropriate time ; he is dominated by an urge to make money and believes that the clothes he is wearing are helpful as a means to that end ; or he is under the sway of the instinct of self-preservation and is leaving the country to avoid some threatening danger. Such are the ways in which we might interpret what we see. In each case we assume purposiveness and try to identify the purpose. Now it will be noticed that in the list of suggested interpretations all the items are not on the same level. We can ask the question " Why ? " again in some instances. " He wishes to impress us." " Why ? " " Because he is dominated by the instinct of self-assertion." " He wants to catch a train." " Why ? " " Because he wants to go to London." " Why ? " " Because his financee lives there." " What difference does that make ? " " He is dominated by the reproductive instinct." But there will come a time when " Why ? " will produce no further information. " Why has he an instinct of self-assertion ? " " Why has he an instinct of self-preservation ? " are questions which can only be answered, by saying : " Because he has." Such urges, drives, tendencies, instincts—the name does not matter—are taken to be ultimate.

In this way we get a hierarchical conception of the dynamics of behaviour. There are the immediate purposes, wishes, desires, intentions, or connations ; these are themselves determined by, expressions of, or appear in the service of, other desires, purposes, etc., until eventually we come to fundamental urges, drives, or instincts which we cannot subsume under others, and which are there, as one might say, " in their own right."

Thinking along these lines psychologists have made lists of such ultimate driving forces. The most famous of these

is that suggested by Dr. McDougall (4, p. 97), and we will go through his list item by item.

The list is as follows: (1) Food-seeking propensity, (2) Disgust propensity, (3) Sex propensity, (4) Fear propensity, (5) Curiosity propensity, (6) Protective or parental propensity, (7) Gregarious propensity, (8) Self-assertive propensity, (9) Submissive propensity, (10) Anger propensity, (11) Appeal propensity, (12) Constructive propensity, (13) Acquisitive propensity, (14) Laughter propensity, (15) Comfort propensity, (16) Rest or sleep propensity, (17) Migratory propensity, (18) A group of very simple propensities subserving bodily needs, such as coughing, sneezing, breathing, evacuation.

We must realise at the outset of our examination that Dr. McDougall does not regard his list as final, and we shall find that an examination of his list will reveal several important points which are raised by any theory of this type.

The first thing that we notice about the list as a whole is that the propensities are named by reference to activities rather than ends. If we are in search of the ultimate driving forces which dominate man's activity we shall have to reject from our list those items which (*a*) name mere reactions to irritation, and (*b*) name actions which, however common, are obviously means to ends rather than connected directly with ends in themselves. On these grounds we shall reject propensities (2) and (16) because of (*a*) above. The criterion (*b*) is not so easy to apply. What we have to ask is: "Do people do this, say, cry aloud for assistance (11), because they like the state of crying aloud, or do they cry aloud because they want help, because they want to be in a state of safety?" In the instance which I have chosen it is clear that people do cry out because they seek safety, and crying for assistance is one of the many *means* of achieving it. Such considerations will lead us to reject (11) and perhaps (1), and help us to reformulate the list under different headings.

Food-seeking propensity.—Food is sought, not as an end in itself but in the interest of self-preservation with respect to bodily upkeep.

Sex propensity.—Courting may lead to mating, in the sense of sexual intercourse, as an end in itself, or it may lead to mating in the interest of reproduction. In human beings the "sex propensity" has escaped from the biological framework, and many actions which would be said to be performed in the interests of the reproductive urge are, either by design, or by the nature of the case (*e.g.* homosexual intercourse) not calculated to lead to reproduction at all. If the biological standpoint be taken up, we shall have to say that human beings have raised a means to the dignity of an end in itself, while if we concentrate on intercourse as providing the only end in itself in this connection, we must say that offspring are merely incidental to the sexual act, when performed under certain conditions. It is interesting to notice that there is reason to believe that some primitive peoples are not aware of the connection between the sexual act and the phenomena of reproduction.

Fear propensity.—It is not a happy choice of name. What we seek is self-preservation, and fear is the emotion we experience in inverse proportion to our success in achieving it.

Curiosity propensity.—"To explore strange places and things" (4, p. 97) is a propensity which is doubtless to be detected in such animals as dogs and monkeys, but in human beings it involves an end in itself. We seek to be in a state of knowing, and it is doubtful whether other organisms are aiming at that objective. The sniffing of the dog and the explorations of the monkey are typical acts, no doubt, but is it the satisfaction of curiosity that the animals are after? Is it not possible that such behaviour is either precautionary, or food-seeking? Whatever we may say about dogs and monkeys, it is obvious that in western man knowledge is sought for its own sake. The reader should remember that what we are saying about "human beings" should be held to concern western man, rather than mankind in general. Of course it is possible that all we say applies to mankind in general, but we should be careful to remember that our specimens belong to a sub-variety of human beings. In the case of curiosity this is important

because we are apt to assume that "savages" speculate about philosophical matters in the same way that we do, and the result is that we take for granted that they will have answers to our questions about their religious observances. There is reason to think that they do not interest themselves in philosophical subjects, and it is quite possible that they have not a desire for knowledge for its own sake at all.

Gregarious propensity.—This will be dealt with in Chapter II.

Self-assertive propensity.—There is no doubt that people like to have power; they like to show off and dominate others. Looked at from this point of view, it will be seen that self-display, in the ordinary sense of the term is by no means the only method of satisfying a craving for self-assertion.

But, besides this point, there are several interesting questions to be raised in this connection. (*a*) Is self-assertion a social trait? (*b*) Is self-assertion an urge in its own right?

(*a*) The point here is whether self-assertion implies an audience. It is perfectly clear that people like to assert themselves over nature and over intellectual problems, but it seems at least plausible to suppose that the forces of nature against which a man pits his strength are in some way personified in his mind, or else that he displays his prowess before a cloud of invisible witnesses.

(*b*) The question here is one that lies at the back of an important school of psychologists associated with the name of Dr. Adler of Vienna. They point out that some of us start the battle of life with physical or mental disadvantages, and that all of us have been through a stage when we were at a disadvantage because of our infantile incapacity. The result of this is, according to their view, that a rebellious disposition has been established in us, in virtue of which we try to compensate for our inferiority. Undoubtedly this does explain a great deal of our power-seeking, but the question is whether any of us is innately filled with a specific self-assertive drive which would make itself felt whether

we had an "inferiority complex" or not. Further discussion of Dr. Adler's theories will be found in Chapter VII.

Submissive propensity.—Here we are faced with a serious question of fact. Do we seek situations of submission for their own sake, or do we merely react submissively under certain circumstances? The most plausible account seems to be that submissive responses are not a homogeneous collection. They may be divided into at least three groups. (1) An attitude of submission may be called forth, but not sought after, by certain situations. This class of submissive responses should not come under the heading of ultimate drives at all. (2) Submissive responses may be sexual in nature. (3) Submissive responses may be tactical moves called forth in the service of a variety of tendencies. Any given submissive response may come under all three headings: the lovee may cringe before an imposing lover and make capital out of the submissive attitude adopted.

It is still, however, possible that some people may seek a position of submissiveness for its own sake. There may really be a "slave mentality." The point is difficult to decide because we know too little about substitute satisfactions.

Anger propensity.—"Anger" is a word usually denoting an emotion, but we must admit that there is a tendency, in Dr. McDougall's words, "to resent and forcibly break down any thwarting or resistance offered to the free exercise of any other tendency." The behaviour—kicking, biting, sulking or punching—is varied, but the situations in which the response is elicited are all characterised by a blockade on the activity which is in train in the service of some driving force which has been aroused. The position seems to be that we seek the free exercise of our tendencies, and that the urge we are talking about is aroused when this freedom is curtailed.

Constructive propensity.—Many psychologists hold that this tendency—to be in the condition of having constructed—lies at the back of much artistic activity. We shall see that Dr. Freud is inclined to the view that constructions are of the nature of substitute performances.

Acquisitive propensity.—Here, again, we are faced with evidence which goes to show that a certain amount of hoarding has substitutive value, but it does look as though there is a certain tendency to seek possession which is independent, and must be regarded as an end in itself.

Laughter propensity.—This important reaction is clearly not a purposive force, and is an expression of emotion rather than an ultimate end.

Comfort propensity.—No one will deny that we seek comfort, but the comfort-seeking propensity is more conveniently dealt with under the pleasure-pain principle.

Migratory propensity.—Obviously not all travelling can be put down to a tendency to travel, but here again we may find that there are people whose wanderings cannot be interpreted under any other heading.

In the light of this examination we can see the importance of distinguishing as clearly as possible between ends and means, and we notice that the same activity can be interpreted in various different ways on different occasions of its occurrence.

A reformulation of the fundamental drives might run as follows—question marks have been placed against those tendencies which may not be ultimate, *i.e.* which may refer to aims which are not ends in themselves :

(1) *Self-regarding interests :*

A. Self-preservation :

- (1) With respect to bodily upkeep—food, sleep, drink.
- (2) With respect to safety from danger.

B. Self-assertion—or compensation for inferiority.
C. ? Self-abasement.
D. Knowledge-seeking.
E. Possession.
F. ? Wandering.
G. ? Construction.
H. Tendency to preserve freedom of action.

(2) *Reproductive interests :*

A. Sexual intercourse.
B. Reproduction proper.
C. Parental interests :

(1) Aiming at the well-being of children (? and other weak creatures).
(2) Aiming at the establishment of a home.

(3) *Social interests of the individual :*

A. Aiming at being in conformity with the fellow members of a group.
B. Aiming at being in company with one's fellow creatures, especially members of groups to which one belongs.

Another, and shorter list, has been suggested by the Freudian school of psycho-analysts. For them there are two fundamental drives—love and destruction. Self-preservation is sought because we love ourselves, knowledge is sought because it is fundamentally associated with sexual knowledge, self-assertion is regarded as a sexual gesture. This means that such forces are not regarded as forces in their own right, and that activities which come under such headings as " manifestation of the knowledge-seeking tendency " are really manifestations of the sexual urge in an unexpected disguise.

Such a simplification is attractive because it satisfies the demands of the principle of scientific economy. Explanation involves linking up one thing with another, and the more " ultimates " you have the less scientific will your theory appear. The question which we shall have to face later is : on what evidence are so many diverse purposive activities linked up with, and considered manifestations of, the love instinct ?

The importance of a destructive element in our make-up is a fairly recent development of psycho-analytic theory. There is strong evidence that we harbour hatred against our parents as well as love, that we resent with " death wishes " the rivalry of our brothers and sisters, that we turn our

destructive impulses against ourselves in the form of self-punishment, and that our aggressive attitudes colour our social lives.

In " Beyond the Pleasure-pain Principle " (5), Freud makes the bold suggestion that the two forces which dominate living existence are the preservative force of Love, and the tendency of inert matter, disturbed by life, to attempt to restore its original peace.

The next, and even more startling step is to identify aggressiveness with this " death instinct " in the individual organism. The " death instinct," primarily turned against the individual himself, is subsequently turned outward onto his enemies, real or imaginary (6).

It will be noticed that the forces which figure in the frameworks we have been discussing are departmentalised, and now we must turn to the consideration of a more general plan.

It has been said that human beings seek pleasure and avoid unpleasure, and that this principle is the mainspring of their activities. There are two objections to this view : (1) it is too general to be of very much use ; we should be grouping together under the heading of pleasure aims which it may be convenient to keep apart, (2) it is plainly false, if it be taken at its face value.

If by pleasure we mean what common sense means, then it is obvious that people often avoid it and seek pain instead. To get round the difficulty by saying that they are seeking a greater pleasure is to run the risk of using words in an unusual sense, or of tautology. If we *define* the ultimate ends which people seek as greater pleasures than those they forego, then there is no more to be said, but at the same time no information has been conveyed. This is why " psychological hedonism " has been abandoned for the " instinct theories " we have been discussing.

Some attention, however, must be paid to pleasure and unpleasure as determining factors. Taken as a fundamental principle the doctrine that we pursue the one and avoid the other is unsatisfactory.

(1) Freud bases his theory on a pleasure-unpleasure principle, but corrects the paradoxical implications of such a view by bringing in other principles as well. The *repetition-compulsion* may make us repeat past experiences however unpleasant: as a manifestation of the effort to restore equilibrium, it springs from a source " beyond the pleasure-pain principle " itself; the *reality principle* makes the conscious self realise that present pleasure may have to be abandoned because of threatening pain, and accept pains in the interest of reducing pressure, which is the real purpose of the " pleasure-pain " principle.

(2) We can regard pleasure and pain as being the accompaniments of instinct satisfaction, and at the same time allow that the tendency to seek the first and avoid the second has some dynamic force of its own on certain occasions:

(*a*) Some sensations may be pleasurable, and may be met with by chance in the course of our lives: *e.g.* we may have been put into a hot bath, have acquired a taste for hot baths simply because of the pleasurable sensations which we get from them.

(*b*) Some alternative modes of satisfying our instincts may give us more pleasure than others and this may influence our choice of alternatives in the future.

(*c*) Some instincts may give us more pleasure than others when we satisfy them, and this may add weight to such instincts when a conflict-situation arises.

This second view is a convenient one when we are not concerned with unconscious influences. We must give the tendency to seek pleasure and avoid pain some place in our scheme. It seems to have a guiding influence rather than a propulsive force in most cases, but there are occasions (" a " above) in which it has a power of its own.

Other dynamic forces of a general nature have been suggested as influencing our behaviour together with those which we have already mentioned.

Jung suggests that there is a tendency which makes us try to compensate for a lop-sided development in our orientation to life. If we are turned towards the outside world too

much, there will be a tendency aroused in the direction of allowing some play to our inner natures ; if we are turned inwards too much, then that part of us which takes account of the external world will demand a hearing.

The " personalistic school " (Stern) insists that we must take account of an organising force which welds individuals into the particular persons they are, and that actions can only be understood if we fit them into their place in the personality-patterns to which they belong.

Lastly there are numerous super-personal tendencies which influence individual lives. The most important of these, the social forces, will have to receive special treatment in Chapter II.

Other super-personal forces are mainly of an evolutionary nature. Mr. Heard (7), for instance, has suggested that there is a tendency towards, and later on away from, individualism.

The *Dialectical Materialists* assert that changes in the economic structure of societies influence the behaviour and beliefs of the members of those societies, without their realising what is happening.

The *Cultural psychologists* (*Geisteswissenschaft*) declare that the life of the individual cannot be understood if we neglect his cultural environment ; the religious systems, the æsthetic products, the economic complexities, and the scientific formulations are a precipitation of man's cultural nature, and exert a determining force on subsequent generations.

All these theories which present a framework in terms of " urge," " tendency," " instinct," " human nature " and the like are hierarchical in structure. You have the ultimate ends which give the names to the forces, and then you have the intermediate ends by means of which the ultimate ends are achieved. These minor ends, specific manifestations of the ultimate driving forces, require the conception of even more immediate ends by means of which *they* are realised. A general urge, therefore, is conceived of as clothing itself with the concrete vestments of " desire," and the arousal of a

desire, say to get your dinner will itself give rise to the immediate desire to catch a tram.

Let us attempt to assess the value of theories of this type :

(1) The concepts of " instinct-drives " is valuable because it helps us to bring some sort of order into the multiplicity of human behaviour. If we classify a number of different acts as all subserving the same purpose, we can see some pattern emerging which helps us to co-ordinate the bewildering material at our disposal. The same may be said of the super-personal tendencies. They, too, introduce order and invite our attention to patterns which we may have missed.

These theories have been classed as " common-sense " theories because they are really codifications of the experience of everyday life. Man appears in their frameworks as he appears to us in our discussions of other people's characters. There is no strange talk of neural and muscular changes, such as is found in the works of the reflexologists, there is no talk of the tensional systems of the " Gestalt school," and their only difference from the naïve psychologising of common sense lies in their attribution of certain pieces of behaviour to motivating forces which are not obvious to the untutored eye. It must be noticed, however, that even when the speculations of the Freudian school seem wilder than anything common sense could produce, they are supported by arguments the whole point of which is to make them seem " sensible " : we fear death and destruction, that will be admitted as " sensible " by every one, the Freudians add unexpected sources of danger, but, granted those sources of danger are apprehended, it is " only reasonable " that we should be frightened of them.

(2) The main disadvantage of these theories lies in the vagueness of the nature of the forces with which they deal. This objection may be met in the following way. It may be said that the ultimate nature of these forces can be left vague for the present. Since human behaviour is purposive, it is our business to seek the ultimate purposes which human beings strive after and interpret their behaviour in terms of them. Advance in our knowledge will take the form of

showing that behaviour which looks as though it were pointing in one direction is really pointing in another, or discovering that what we thought was an ultimate aim is really a form taken by another aim, and we can leave the question: "What is it that drives us on?" unanswered. Perhaps eventually we may know enough about the working of the body to reinterpret our psychological framework in physical terms (*i.e.* in terms of the geographical world), perhaps we shall have to suppose that there is some special life-energy which operates under laws of its own; in any case we can go a long way without coming to a decision on the matter.

Many psychologists, however, feel that the vagueness of the forces of instinctive drives is an insuperable objection to them, and that, however organised our knowledge of human beings may be with their help, we must tackle the whole matter from another angle. This attitude leads to the other types of theory we have to discuss.

(3) It is objected to the theory of instinctive drives that it savours of an out-of-date methodology (8, Chap. I). Just as Aristotle said that stones fall because they have a tendency to do so, human beings are said to seek self-preservation because they have a tendency to do so. Modern science is interested in the network of forces operative in a field at any given moment and not in latent forces hidden in objects. The answer to this is that we cannot help being interested in people and their characters as well as in their behaviour on given occasions.

(3) The next objection is closely allied to the last. It may be admitted that the instinctive drive type of theory is useful from a general point of view, but that when we come to apply it to particular instances of behaviour we are faced with a mass of alternatives. We have seen that any act may be the expression of a variety of instincts and that any instinct may satisfy itself in a variety of ways, how then, it is asked, are we going to judge which instinct is operative?

This is quite true; we cannot tell what the motives of a person are unless we view his behaviour at one time in the

light of his behaviour at others. But the alternative theories are no better off in this respect, and the "common-sense" theories have this advantage: they provide us with a linguistic by means of which we can bring out one of the salient features of human behaviour, multi-determination. Hardly a single piece of behaviour is performed from a single motive; perhaps the wolfing of a crust by a hungry man is such, but the greater part of man's activity consists of the grinding of the greatest number of axes at the same time. The onlooker, prepared to praise and blame, picks out some of the motives and misses the complexity: the behaviour is either good or bad, but the detached student of human nature finds his time fully occupied in unravelling all the motivating forces at work precipitating a single gesture. Such analysis can be done more easily with such instruments as "desire" and "tendency" than with the concepts of "lowered synaptic resistance" and "tensional systems."

Let us now turn to the types of theory which attempt to avoid the objectionable features of the type we have been discussing.

II. Reflex Theories.

The psychologists, who submit this type of theory, go back to the series of behaviour itself; they are not so much interested in the people who behave as in the actions they perform. They split each piece of behaviour up into its parts, find out what nerves and muscles are involved, and then try to discover what rules govern the connections of these nervous and muscular excitations. The nervous system and the muscles which are moved by the motor (or efferent) nerves are thus their explanatory material.

The simplest type of reflex theory is built up of simple reflex arcs. A reflex arc consists of three parts: (1) A sensory part which ends in a special sense organ (eye, ear, etc.) or just under the skin, or in certain internal organs of the body, (2) a motor part which ends in muscle tissue, and (3) connector parts which join (1) and (2). Stimulation of the sensory part causes impulses to pass through certain

connector parts to the motor part and along this to the muscles. No one doubts that this plan represents certain simple responses fairly well. Stimulation of certain sensory nerves in the eye cause an impulse to pass along them which eventually, via connectors, reaches the muscle which controls the iris diaphragm or shutter, causing it to open or shut and thus vary the amount of light allowed to enter the eye.

When we are faced with instinctive acts of a certain complexity we seem to have a chain of reflexes, some innervations being determined by stimulations from the outside world and some by stimulations coming from within. The mechanism works like clockwork. Pathways for the nerve impulses are already there, the junctions (synapses) across which the impulses have to pass have their resistance lowered in advance by the nature of the organism. But we have seen that in the case of human beings we have not got such complicated series of actions prepared for from the start; the pathways have to be made by experience; new connections have to be established on a basis of those few connections which are already there, and these new connections have to be further interconnected.

There is, however, a curious phenomenon which helps us out of our difficulty. If a dog sees food its mouth will water—here we have a simple reflex—but if a dog sees food and hears a bell at the same time, then its mouth will water at the sound of the bell even if the food is not there. This response to a new stimulus is said to be "conditioned" to it, and our framework of reflexes is enlarged by the addition of "conditioned reflexes."

If we add that a nerve impulse will pass more easily over a synaptic junction which has already had its resistance lowered by previous impulses passing over it, then we have a basis for habit, and our picture is complete. Man's behaviour is simply a response on the part of his "motorium" to impulses coming along his "sensorium" mediated by central connecting links.

We find, however, on further investigation that we must add a further touch. When a reflex is elicited more is

happening than we think. If the scratch-reflex of the dog is excited by stimulating its shoulder, the innervation which follows is accompanied by other innervations. There is therefore the rest of the organism to be considered when we elicit any given reflex. Each reflex must be conceived of as operating upon a background of inhibition and facilitation. The unravelling of such background phenomena, and the insistence on their importance is the contribution of the "Integrative Psychologists" (9). It will be seen that the introduction of the "total condition of the organism" is an important factor in such theories because it gets their adherents out of the difficulties raised by the very diverse pieces of behaviour which they have to explain. If an organism behaves in an unexpected manner they can look for the cause in the total state of the organism at the moment as introducing the modifying influence.

Let us now assess the value of these theories:

(1) They have a clarity and simplicity which contrasts favourably with the vagueness of the instinct theories. The energy is supposed to be physical and no new kind of force need be introduced. We feel that we are moving in a more "scientific" world, and many temperaments are gratified by the contemplation of man as "nothing but" a bundle of responsive nerves and muscles.

(2) They suffer, however, from their apparent virtues. The pathways are too rigid. If we have been "conditioned" to make the response "Quite well, thank you" to the stimulus "How are you?" then the elicitation of that response must involve precisely the same nerves as carried the afferent impulse on the occasion of the learning. It is therefore difficult to see how we are able to respond to the "same" question when uttered at a different pitch, because different nerves are being excited, *i.e.* nerves which have not previously been connected up with the motor innervations. Our response, too, must be precisely the same in tone as the learnt response, unless mechanical obstacles, such as a cold, prevent it; this makes it difficult to see how we can "decide" to respond in a squeaky voice or a gruff one. Any answer to

these objections in terms of " understanding " is obviously out of the question.

(3) These theories leave out the purposiveness of behaviour, and the relation of " next " is the only one they have at their disposition. This means that no behaviour really " leads up " to a certain " end," after which a " new " piece of behaviour starts. The relation between the end of one piece of behaviour and the beginning of another is the same as the relation between the acts constituting the pieces of behaviour—it is the relation of " next-door-to." The result is that the " meaning " of an act in relation to other acts is a concept which has to be left out.

(4) A further difficulty is met when we consider that characteristic of behaviour which has been called " persistence with varied effort." If at first we don't succeed we try again. If our actions are the outward and practical expression of internal innervations, whose pathway is fixed by the constitution of the organism at the moment, then we must suppose that the organism is fitted out for every possible emergency. The total state of the organism can be appealed to in order to explain why we persist at all : there might be certain chemical conditions in the organism which act as irritants, but the actual actions themselves must be prepared for, and this entails a more complicated system of nerves than we have reason to believe in.

(5) Closely connected with this objection is the argument that the initial preparedness of organisms must be more complicated than we have any reason to suppose. When a chick emerges from the egg, stimulation of the " optic sector " will elicit the peck reflex directed towards the object, light rays reflected from which caused the impulse to travel along the optic nerves. This sounds simple, but it is not as simple as it sounds. There must be an indefinite number of prepared pathways which fit the chicken for any position in which its eye may be with respect to the grain. If the area X be stimulated this must be connected with the motor innervation Y, but if the area A be stimulated, this must be connected with the motor innervation B, which produces

the " same " result. Since we cannot predict what will be the position of the chicken's retina *vis-à-vis* the grain, and since we only know that it will peck fairly accurately at it, there must be a very complicated set of pathways ready to be used, and so great must this complication be, that we cannot put our ignorance of it down to our lack of knowledge of the nervous system.

III. Gestalt Theories.

At the beginning of this century a group of energetic psychologists in Germany were associated with a theory of psychology, the central feature of which is the concept of " Gestalt." The most important writers of the school of Gestalt psychologists are Koffka, Köhler, Wertheimer and Lewin. We shall have to refer to their contributions to the subject under a variety of headings, and we shall find that they are not the only psychologists who use the concept which gives its name to the particular school whose teachings we are about to discuss.

The principle of " Gestalt " is that certain relatively segregated sets of happenings have to be considered as wholes, such that what happens will be partly determined by the rules which govern the wholes as units. This means that there will be a closer connection between items belonging to wholes (or configurations or patterns, as they are sometimes called) than there is between such items and items belonging to different wholes. A piece of behaviour is a relatively segregated whole, and the actions which make it up are what they are partly because of their place in the whole of which they are constituents ; their position in the whole gives them their " meaning." The wholes of behaviour are, as it were, patterns stretched out in time, they may be compared to tunes in which each note has a certain meaning because of its relation to the whole tune.

This is one way in which the notion of " Gestalt " is applied to our problems, but we still miss the dynamics of the series which make up the pieces of behaviour. So

far we have indicated the segregational aspect which makes the separateness of a figure on a background, and the unity of a tune primary facts, unit systems not built by processes of addition, but held together by the forces inside which separate them off from forces outside.

These internal forces, however, have laws of their own, and when a system of such forces is established it will behave according to these laws; if it is stable it will resist alteration, if it is unstable it will strive towards stability, and if it is incomplete it will seek "closure."

There are two main fields in which these systems are established: (*a*) the organism-environment field, and (*b*) the organism itself. Lewin (8) depicts the dynamic relation between the organism and its environment in terms of "vector forces" which pull and push the organism in various ways. These fields of force are "Gestalten" or "configurations" and will obey the laws of stabilisation. Within the organism itself a piece of behaviour is like a tune which seeks its end, the figures we see in the "behavioural world" are seen as we do see them because they are the conscious representatives of the configurations in the nervous system to which stimulation has given rise, and these again leave "trace systems" which will obey configurational laws. In fact all experience and all behaviour is presented as the manifestation of configurations which interact and alter in accordance with the laws of wholes. The Leipzig school, dominated by Krüger, introduces a wider field: the self is a system of systems, in the larger system of society, which, again is only part of the system of the Cosmos itself. They, therefore, concentrate on the *developmental* aspect of psychological phenomena.

Let us assess the values of this third type of theory:

(1) It brings back the purposiveness and meaningfulness of behaviour. An act is performed because its performance leads to the reduction of tension in a system seeking "closure," and one piece of behaviour is segregated from the next, not because it merely comes before it, but because it is one unit and the next piece of behaviour is another.

(2) It accounts for persistence with varied effort. Experiments on children performed by Ovsiankina (10) show that if they are interrupted in a task which they like doing, *i.e.* which arouses a tensional system, the children tend to return to it after the interrupting activity, unless the interrupting activity itself has some kind of substitute value for the reduction of the tension which lay behind the first activity.

(3) The organism is not tied down to certain fixed pathways determined by lower synaptic resistances when it responds. A " new " response may be made if it fits the pattern of behaviour and satisfies the demands of the dominating tensional system. Against this it may be urged that the theory cannot be regarded as established until we can predict by means of it exactly what a person will do under given circumstances. To say that he will act in such a way as to secure the reduction of tension is not enough ; we are liable to have the nature of the tensional system derived from the actions to which it gives rise instead of vice versa.

(4) The tensional systems remind us of the instinctive drives, but it is claimed that they are more " scientific " because they do not leave the nature of the force vague. It is further claimed that the notion of the tensional factors operative in situations is more in accord with modern scientific conceptions.

It will be seen that we have been able to bring fewer objections against the framework suggested by the Gestalt psychologists, and the fruitfulness of their way of looking at the subject is displayed in the enormous quantity of experimental work to which it has given rise. For all that, they cannot be said to possess the field entirely. There are some occasions when we seem to perform automatic acts which have but little " behavioural " meaning, and the reflex theory seems adequate to deal with these, and when we want to talk about people, rather than their behaviour, we have to fall back on the concepts and various classifications of the first type of theory. If a person is in a dangerous

situation we can talk helpfully about the dynamics of the situation and the tensional systems seeking closure, but we often want to refer to types of tensional system which people, because of their " natures," are liable to have aroused ; we want to refer to their dispositions and their characters, and here the names we shall use are the names used by the " instinct " schools for their urges or drives.

The upshot of this chapter is that we require all three types of theory. It may be that for heuristic purposes it is desirable that each school of psychology should believe that the others are wrong, but for the student it is essential that he should appreciate the position of each author he reads, and understand why that position has been adopted.

(1) Koffka. Principles of Gestalt Psychology.
(2) McDougall. An Outline of Psychology.
(3) Watson. Psychology from the Standpoint of a Behaviourist. (Third edition.)
(4) McDougall. The Energies of Men.
(5) Freud. Beyond the Pleasure Principle.
(6) Jones. British Journal of Psychology, XXVI, p. 273.
(7) Heard. Ascent of Humanity.
(8) Lewin. A Dynamic Theory of Personality.
(9) Marston. Integrative Psychology.
(10) Ovsiankina. Psychologische Forschung, 11, p. 302.

CHAPTER II.

THE SOCIAL ENVIRONMENT.

WE are all conscious of an environment—indeed of several such environments—which are in many ways more powerful and less obvious than the behavioural environment of things. We are members of societies, we are bothered about the opinions of our fellow members, and we are constantly being called upon to adjust our private interests to fit in with those of other people.

Let us consider a few of the most obvious phenomena which we should all agree to be connected with the social side of our natures :

1. We are liable to experience loneliness when we are separated from our fellows and pleasure when we are restored to their company.

2. We defend the interests of the groups to which we belong, we resent criticism directed against them, and we are prepared to go to considerable personal inconvenience in order to assist them when we feel that they are threatened.

3. We tend to conform to the dress, conventions, habits, and moral codes of the societies of which we are members.

(1) It will be noticed that the first characteristic can be regarded as an instinctive urge. We seek companionship just as we seek food, and we feel the emotion of loneliness when our urge is not satisfied, and satisfaction when we are surrounded by other people. It is an urge which varies in strength from person to person ; some people approximate to cats and walk by themselves, others are not happy unless they are hiking with a party. Few people are like Ludwig II. of Bavaria and enjoy watching an opera in an empty theatre,

most of us like our cinemas comfortably full, and many of us after having been separated from our kind in a foreign country feel a satisfaction when we are returned to the streets of our native town or village and rub shoulders with members of our tribe.

The last example has introduced an important feature. It may be true that a man who has not seen another human being for years would find his loneliness assuaged when he sees any other member of the species, while a man who has lived for years among whites may feel relieved when he once more mingles with men of his own colour. Usually, however, there is a certain selectivity. The mere presence of other human beings is not always enough. A man may leave his village and plunge into the life of a large city, where he is engulfed by larger crowds than he has ever known before, and yet he may feel lonely, and his loneliness may be intensified by the mass of people to whom he does not "belong."

(2) This belonging to a group brings us to the second characteristic mentioned above: loyalty. We understand loyalty as involving the relationship between an individual and a group to which he belongs, whose vicissitudes matter to him. We are insensibly compelled to speak of a group as a thing which has a life of its own and of the individual member as being moved this way and that, not by forces springing from himself, but by the pull exerted upon him by the group to which he "belongs."

(3) The same way of looking at things is forced on us by the third characteristic: conformity. The moral code, the manners, the dress to which individuals conform are characteristic of the groups to which he belongs, and he looks upon them with respect for that reason; they are, as it were, badges of group membership, and infringement of custom, or alteration in the accepted uniform, are resented as tending to loosen the bonds which bind the group together, or as indicative of a lack of vitality in the group itself. Again we cannot help thinking of the group as a thing, which *has* a moral code, a set of conventions, a typical dress, as parts of

its shape or pattern, which distinguish it from other groups.

From this we see that there are two units to consider when we deal with the social nature of man : there is the individual, considered as a member of a group, and as having a tendency to seek companionship, and then there is the group, considered as a whole of which we predicate qualities and in which we conceive of dynamic forces which will modify the path of life of the individuals who swim into its field.

And yet there is no group apart from the persons who make it up. A group is a collection of related particulars, and these particulars, in virtue of the relations which bind them together, will behave differently from the way in which they would behave if they were not so related. If this is accepted, there is no harm whatever in *picturing* the group as something apart from the persons who compose it, and it is convenient to do so, because the individual feels the conventions of the group as coming in some sense from outside himself.

The invention of a " group soul " or " group mind " as something which has ideas, experiences and volitions above the mental events which go on in the minds of its members, is entirely unnecessary for interpretative purposes, and unwarrantable as an inference from the evidence. It is mainly due to the tendency to " reify " whenever we meet with a noun.

The question remains, however : what is the nature of the group bonds ? Can we interpret group life as arising out of individualistic life, or must we suppose that there is a specific " social side " to man's nature ?

(1) If there is no specifically social side to our natures we might suppose something like this : men are interested in their own private satisfactions, and suddenly realise that if they were to co-operate they would be able to satisfy their desires more efficaciously than if they remained each working for himself. They therefore make a " social contract " together to help one another and respect one another's interests in return for one another's assistance. This rationalistic theory of the social bond is unsatisfactory for a variety

of reasons. (1) Before co-operation had been tried they would not have any idea of what it was like ; (2) a more detailed investigation into the nature of man shows that such deep-seated passions as are involved in group life (tribal loyalty, conformity, conservatism, etc.) are not likely to be based on anything as superficial as a rational determination, and (3) if society were based on reason we should expect it to be a more satisfactory affair than it is.

(2) Perhaps, it might be said, societies just grew. A family consists of father and mother and children. The parents have instincts which make them look after the welfare of the children, the children need the affection of the parents, and fear punishment, and so they grow up, respecting the rules which the parents lay down. *Their* children will be brought up in a larger group in which the habits taught by the grandparents will be taught to them, they will develop ties of affection and respect towards the members of the now enlarging family circle, and so the community grows. Each successive generation of children will be born into a company of people whose habits they will acquire and whose persons they will have a fellow-feeling towards, simply because they are always about the place. They will eventually form an idea of the group to which they belong and form a sentiment towards it, because of which they will be angry when the group is jeered at and pleased when the group is praised. This sentiment towards the group will be closely bound up with the " self-regarding sentiment " because the self is raised or lowered in esteem according as the group to which it belongs is approved of, or the reverse.

This is an attractive picture, but there are one or two features of social psychology which are not adequately accounted for :

(i) The social habits which the parents teach the child as the right thing to do are so very odd in many cases that to understand their perpetuation we need something more than the affection and respect which the children feel for their parents. If the " sentiment formed for the group "

be regarded as something extra, then we have the social bond which we are looking for, and which is specific.

(ii) If society is built up on a basis of the affection which self-seeking children feel towards their parents it is difficult to understand how it is that they are prepared to go to personal inconvenience to defend a society which includes people towards whom they do not feel that kind of affection at all. Self-sacrifice for a group is by no means uncommon, and seems to imply a powerful force, over and above the "natural affections," which sometimes impels people to lay down life itself for the welfare of a society.

(iii) To say that man is a "social animal" means, among other things, that he is a "group precipitating animal"; he forms groups within the groups of which he is, by the circumstances of his birth, a member, and these groups display all the paraphernalia of tribal life. A school may be a well-knit group, with conventions, customs, dress, flags and ceremonial noises, all of which are respected by members of the society, and although it is true that any new boy will be taught the rules of the group which he is entering, the group must at some period have precipitated its rules, because it is the nature of groups, once they are formed, to focus their unity on to objects, actions and persons, which then become tribal symbols. Such groups do not spring out of "natural affection" to parents, but seem to imply a specific group-making tendency.

(3) The psycho-analytical school has made a startling suggestion, which at first sight seems so odd that we are tempted to pass it over as absurd. According to this view, when a number of people have libidinous interest towards the same objective, and when these libidinous tendencies are inhibited in their aim, a relationship is generated between the persons who have these tendencies, which binds them together. It is as though there were a limited amount of libido to go round, and if people dissipate it by satisfying their desires they tend to live private and egoistical lives, whereas, if it is inhibited and not allowed satisfaction it "comes out" in the form of affection and fellow-feeling.

If it is polarised on to an unattainable objective, then the fellow-feeling generated by its being " bottled up " acts as a binding force, coagulating into a group all those whose libido is directed on to the common " object ".

There are two parts of the theory which do not necessarily hang together : (1) the view that inhibited libido generates affection, and (2) the view that persons, whose libido is directed on to a common objective are bound together by ties of fellowship. The first might be true, even if we think that the second is not.

In favour of the second part of the theory we immediately think of the light it might throw on the enormous coagulating power of a leader. Whether we are prepared to regard the other symbols of group unity as objectives of libidinous fixation is another matter.

With respect to the first part of the theory, that inhibited libido has something to do with the vitality of groups, interesting evidence has been collected by Dr. Unwin (1). He made an investigation into the religious and funerary practices of savage peoples, and arranged them in ascending order of complexity. He took this as an indication of the psychic vitality of the groups concerned. He then investigated the sexual restrictions which were prevalent in the groups, and found that there is a certain correlation between sexual restriction and group vitality. He further shows that there is evidence of the same correlation to be found if we examine the rules of sexual restriction and the signs of culture in ancient civilisations.

On the face of it, it is certainly very odd that the sexual instinct should have been picked out for restriction, unless there be some mysterious connection between the vitality of groups and the amount of sexual license allowed by their customs. If there be such a connection, we are not surprised to find that when a community is being " pulled together " (*e.g.* Nazi Germany, and Fascist Italy) there is a tendency for the reformers to regulate sexual expression, unless, of course, sexual license is, for other reasons (*e.g.* Bolshevik Russia) part of the reformers' " platform,"

because sexual restriction is a mark of the kind of life they are trying to abolish, though even here, now that the ideological value of " free-love " has diminished, there is a drive in the direction of sexual restraint.

Flügel (2) compares the social tendencies of men and women from this point of view, and points out that men, with their inhibited homosexual tendencies, form clubs and societies more easily than women, whose lesser homosexuality is satisfied by the overt demonstrations which society allows them to make towards the members of their own sex, thereby diminishing the amount of homosexual love required for social formation.

Mrs. Isaacs (3) denies any specific social " instinct " in young children, and finds the basis of their social development in their relations to their parents and brothers and sisters, and also in the technique of " displacing " the hatred they feel for one another on to some external objective. " Along with this deflection of hostility from friends to open foes of one sort or another goes the equally important development of allyship amongst friends " (p. 394).

The displacement of hatred as a factor in the generation of coagulation is certainly of importance. The Jews are a useful common enemy for the instilling of nationalistic feeling, and the same principle is undoubtedly at work whenever people band together in the face of a common foe : the friendly rivalry of one " house " against another at a school is an instance of this.

If the deflection of aggression is a necessary factor in social cohesion, it bodes ill for the future unless we can deflect our hatreds on to some objective other than humans.

Glover (4) calls attention to the importance of " bottled-up " hatred as a cause of war. Not only does hatred help to release love, but hatred must be satisfied. We cannot go on hating with words alone, we want to get at the objective and satisfy our aggression in a more practical way. This means that all our treaties and leagues are quite useless unless we remove the aggressive impulses which war satisfies, or find an alternative mode of satisfaction. He also suggests

that a great deal of militant pacifism is itself the expression of an aggressiveness which the pacifists are so busy condemning.

(4) It has, however, been suggested that we cannot understand the social activities of men, unless we suppose that there is something more in their natures besides those instincts which have to do with personal satisfaction or reproduction. It may be that we can derive this " something " from instinctive tendencies which are not specifically social (*e.g.* " group sentiment " or inhibited libido), but if we are not satisfied that this is possible, we have to attribute to human beings a set of specific social tendencies. If we do this, which seems to the present writer the most plausible account of the matter, an important result follows. We shall have to admit that man's social nature demands to be satisfied as much as his individualistic tendencies, and some writers (*e.g.* G. Heard (5)) have suggested that our present discontents may be due to the fact that Western Civilisation has been so preoccupied with the satisfaction of individualism that our social yearnings have been unduly neglected.

Natural groups.—Every one is a member of a family group, a local group and a national group. These groups are " natural " in the sense that they have been precipitated by biological and geographic conditions. It is, of course, true, that national groups have been moulded by economic factors, and the pressure of conquest as well as by geographic conditions, and the same may be said of the local groups of village, town and county, but if we consider the structure of human society as it is to-day, it is convenient to distinguish between those groups to which we belong because we are born into them, from those which we become members of in the course of our lives. It is true, also, that the " natural " groups vary in texture ; some are closely bound together and some are purely political units which have generated no social field worthy of the name. And, further, the hold which one of these communities has on a member may vary from individual to individual. In civilised communities, the largest group to which most people in Europe both factually and psychologically belong is the nation, but there

may be groups of international membership which take priority over the nation group in some cases : a scientist might feel himself to be more a member of the group of his colleagues than of his nation group, and a worker might feel himself more a " worker of the world " than, say, a German or an Englishman.

The origin of these " natural " groups is puzzling. The most favoured theory is that they began with the family, and the ties which bind the family together, and that then, by way of the natural proliferation of the species and intermarriage, the family grew into the social unit. The development is not a simple matter because there comes a time when there are two distinct groups, which may possibly conflict with one another : the family and the " tribe ".

A great many groups developed a " mother-right " structure, in which the group membership descended through the mother, and in which the father was a stranger in his own house. In such cases you have a large group loosely united and composed of intermarrying sub-groups, which are built up on a kinship basis and much more closely knit than the " tribe " itself. The father has to come from a different sub-group from that to which the mother belongs, and therefore the family is not so closely bound together as the kinship group. It has been suggested that this pattern of social organisation is the one out of which all other social patterns have developed, but however this may be, the most common social structure is that in which father-right (agnatic descent) gives the shape to the social organisation. Here you have tribes made up of intermarrying groups, and closely-knit families which are not split by heterogeneous group membership, because the wife becomes a member of the kinship group into which she has married.

In some primitive communities there seems to be a far tighter bond uniting the members, and everything seems to revolve round the welfare of the group. The rules of the community are rigidly kept and no one asks the supreme individualistic question : " where do I come in ? " Collective responsibility is felt if a member of the group does wrong, and

collective resentment may be felt if any member of the group is injured by a member of another group. Morality is tribal; no one is felt to have any rights unless he is a member of the tribe, and a victor can do what he likes with his captives.

It would be impossible to attempt to trace the development of modern civilisation from these hypothetical beginnings, but two points of interest may be mentioned. In the first place the development is enormously varied from one place to another. In China and Scotland the importance of the family has been preserved to an extent which has sometimes interfered with larger concerted action.

In the second place we must notice that the development of civilisation has been accompanied by an increased individualism. Heard (6) has exhibited the whole course of history, the rise and fall of empires, the growth and decay of monasticism, and the rise of capitalism as a drama of the disruptive influence of individualism in societies. The leader is at first sufficiently odd to be regarded as an object worthy to serve as a focussing point for group loyalty, and he is sufficiently social to feel himself to be the rightful protector and ruler of the group. Then, as his individuality increases he drops his social (and priestly) rôle, and uses the group to help him found an empire for his own aggrandisement. But at the same time other individuals will be precipitated and they will ask " where they come in," and the State will not be able to support the tension. The Empire will collapse and the whole process will start again at a different level until a society is formed sufficiently stable to support and use the individualistic propensities of all its members.

Magic.—Primitive man makes connections between things which we think absurd. If he wants rain he may pour water on to the ground out of a bowl, and he behaves towards objects which belong to himself and other people as though there were some inner connection between such objects and their owners. Such practices are called respectively: " imitative " and " contiguous " magic. They seem to in-

dicate a different system of ideas from that which we ourselves employ. Like is closely associated with like, and therefore you must not ravel up your string when the fishermen are out fishing, you can promote fertility by performing the sexual act in the fields, and you can injure your enemy by making a wax image of him and sticking pins into it at the appropriate places. A man's personal belongings are so " personal " that he has to hide his nail clippings and even his name lest they should fall into the hands of some one who might do him damage.

Besides this there are in his view specially powerful people who exude and manipulate that general " power " which primitive man seems to apprehend as lodging in certain places, persons and things, and which may be the projection of his own feelings in the presence of the strange and impressive.

Lastly the savage seems to have a tendency to confuse words with that which they signify, so that words have power and are regarded as tantamount to actions. From this belief is derived the importance of the magical formula.

All this might seem out of place in a book about the psychology of modern man were it not for the fact that we have by no means grown out of such primitive practices.

There are numbers of objects which possess magical power in our eyes : corpses, sanctuaries and things which have been touched by kings or priests. We are still, when we are not reflecting, influenced by the magic power of words. To ill-wish a person is regarded with disapproval, not merely as an indication of an unpleasant state of mind, and swearing is based on a magical way of apprehending the power of words. It is interesting to notice that the written word is deemed more dangerous than the spoken word in some advanced communities.

Artificial groups.—Besides the groups which are formed by the circumstances of family relationship, and the geographical fact of a number of people living in the same place, there are groups which are generated on a basis of common interest :

(*a*) Groups based on common interests of a relatively permanent nature, involving the presence of the members in one place : schools, universities, regiments, local religious groups.

(*b*) Groups based on common interest or activity, but not involving the geographical propinquity : *e.g.* larger religious groups, political parties, trade unions. It is only under special circumstances that such groups achieve any marked degree of unification.

(*c*) Groups formed for administrative purposes : board of directors, school managers, local girl guide committees. Such groups may persist with varied membership, but they may easily be dispersed when their function has been fulfilled.

(*d*) Groups based on common interest, with no geographical propinquity, which are purely utilitarian in their function : *e.g.* learned societies. Sometimes a certain group feeling may be generated which influences the behaviour of the members of such groups : *e.g.* a doctor may be determined in his action by the desire not to bring disgrace on the profession of which he is a member.

General characteristics of groups :

(1) Groups may vary in the closeness of their texture.

(2) If a group is attacked, the bonds which bind it tend to be drawn closer together.

(3) A group tends to focus its " unity " on to an external object, which then is identified by the members with the group itself :

E.g. (*a*) Persons : the king and the priest are persons on to whom group-feeling is directed. The vitality and fertility of the king is apt to be a matter of concern to the members of the community, and there are cases on record of ritual murder of the chief when his vitality fails him, and he therefore ceases to be an ever-present sign of the vigour of the group he represents. Even in civilised communities, grave anxiety is liable to be felt when the monarch is sick or dies.

Besides kings, other instances of socially sanctified personality will leap to the mind.

(*b*) *Objects.*—Caps, ties, blazers, flags, stones, cathedrals, uniforms, crowns and many other objects may have group-value in the eyes of the members. The little boy is told not to disgrace his cap, the flag is to be defended at the cost of life, and if the culture-pattern includes respect for the antique, a cathedral may be looked upon as a " national monument." Who would dare to untwist the spire of the church of Chesterfield, and who would care to repeat the efforts that have been made to purify the giant of Cerne Abbas ? Durkheim shows reason to believe that the sacred stones of some Australian tribes have their value simply because they stand for the tribes to which they belong. This last instance reminds us that the whole field of totemism, in which the members of a tribe or clan will feel " of one flesh with " their totem—parrot, lion, or jackal—provides us with examples of the projection of group-unity on to external objects.

(*c*) *Actions.*—It would be impossible to enumerate all the actions which are identified with group-membership, and whose non-performance is regarded as a slight to the community. National anthems, college yells, masonic pass-words are examples. In some culture-patterns you take off your clothes, in some you keep them on ; in some places you raise your hand above your head for one purpose, in others it means something else. In short, any act may become sanctified by group-usage, and when this happens, there is something sacred in its performance.

(*d*) *Ideas.*—We do not need ritual acts to perform the function of group-unifiers ; sometimes an idea or an attitude serves the purpose of indicating that the people who share the idea or have the same attitude " belong " together. " The wicked capitalist system," " the communist danger," " determinism," " spiritualism," " equality," all may be watchwords indicative of group membership. The members of the group will pride themselves on " having the right opinions," and they will be duly horrified if one of their members speaks heresy. The sense or otherwise of what he says is of little import, the point is that he has reduced the

vitality of the group by supporting tenets which are not those held, *ex officio*, by its members.

(*e*) *Religious symbols.*—According to Durkheim (7), all religion is to be derived from the group-pull, which is apprehended as the behest of an external and personified power. This is going too far, but it is true that there is a considerable amount of tribalism in religion. The tribe is assisted in its wars by its god, and even the priests of the Prince of Peace have been known to bless the instruments of war.

(4) The group tends to establish and accentuate its unity, where this is practicable, by meeting together in the same place. Durkheim points out the importance of tribal gatherings among primitive peoples, the spectacle of a dying society indicating its feebleness by members " not turning up " is familiar to us all, and we know the joy with which a vital society comments on its own vigour when there is a good muster.

(5) When anything striking has happened in which the group as a group has been involved, the event tends to be raised to the eminence of a group-tradition. The description of the event which is sanctified may be correct or incorrect, and the possession of a " common tradition " is an important binding force. In a crisis the members of a group will be reminded of such items from their store of traditions as are suitable for the occasion.

Artificially created groups.—The energy generated by group membership is sometimes very great. A person may do for the group of which he is a member that which he would not be prepared to do for himself. In any case the praise of his fellow-members is often more valuable to him than the praise of the rest of the world. On this account the characteristics which we have mentioned are sometimes exploited by persons who wish to establish a group, or to instil vitality into a group, which does not, as it were, generate enough vigour by itself. You therefore have uniforms given out to members, they are taught some cry or set of ideas, a person is presented to them for them to fixate their regard upon, and they are kept up to the mark by being told that

the group is in danger. This artificial exploitation of the principles of group psychology cannot be done without considering whether the "totems" provided are likely to "go down" with prospective members, but since one can calculate on people liking to belong to organisations, a little research on the part of leaders will soon reveal what are the suitable symbols to provide them with. Guardsmen are told about the magnificent exploits of their regiments in order to increase their respect for their regiment, and to make them feel that they would not like to "let it down"; if they happened to come from a culture-pattern in which courage was not given high marks, a different set of stories would have to be told.

Class structure.—It is impossible to give an account of the history of the development of classes, but something must be said about the structure of many European countries, because it exerts an enormous influence over the behaviour of persons who live in them. The rise of the middle classes has bridged the gulf between the people who own and the people who are owned, and instead of a gulf we have a ladder "up" which people can climb. The tramp at the bottom is secure because he can fall no lower, and the duke at the top is secure because he cannot fall at all, but there is a series of delicate gradations between the tramp and the duke, and those who are at intermediate stages are liable to look with apprehension in both directions: they may be mistaken for the people "below" them, and they want to be "known" by the people above them. If the structure of society did not admit of "bettering oneself," it is quite clear that people's behaviour would be very different from what it is in many respects. The times we have our meals is determined by the class to which we belong, or to which we aspire. The clothes we wear are determined by the class to which we aspire and the class with which we do not want to be classed. If we feel very insecure, we shall spend a great deal of time and trouble making it quite clear, where we stand: we shall be careful about our speech, careful about the places we frequent, careful about the "rightness" of the

objects with which we eat, and particularly careful about the people we know. Social psychologists point to the " natural " groups, as we have called them, and the " artificial " groups, and it is quite true that they are of great psychological importance, but it is hardly an exaggeration to say that the determining force of the class-structure of society is far greater than the fact of belonging to this nation or that, or living in this village or the other.

The individual member.—We have already said of the individual member that, *quâ* member, he has a tendency to seek the companionship of his fellow-members, that he has a tendency to conform to the customs of the group, and to be loyal to it when occasion demands. Since he belongs to a variety of groups, a conflict of loyalties may arise, and also one must remember that he will not feel allegiance equally strongly to all the groups to which he belongs.

There is, however, another possibility of conflict: the conflict between his individualistic desires, and his group-nature. This may display itself in a variety of ways. In the first place there may be open rebellion without any feeling of social shame, and here perhaps it is hardly correct to speak of conflict at all, because the social pull is so weak that it has not had any deterrent effect. In the second place we have the emotions of embarrassment, shame, shyness, etc., which manifest themselves when the social, and conformatory part is outraged, when, instead of being merged in the group, attention is called to us, or when, which is more often the case, we believe we are making " spectacles of ourselves ! "

Thirdly, we have a betrayal of friction in the form of a protest. People will say that they do not care what other people think, forgetting that such a remark is seldom made unless it is untrue. Then there are the " professionally unconventional " who have all their emancipation in the shop window, and who betray the fact that they are " testifying " (and therefore feeling the pull of the society they are outraging) by their changes of colour, the vigour of their speech, and the way they look round for the shocked faces of their audience.

There is, too, another way in which friction may arise. We have seen how important the father and mother are in a child's life ; it is from them that they learn the prohibitions and exhortations of society, and antagonism to social convention, and anti-social conduct may spring, not only from a simple desire to do something that society as a matter of fact forbids, but from an identification of society with parental control, against which old scores have to be paid. A man may commit a crime, not merely because he wants to achieve a certain end, but for the very fact that the act in question is forbidden by society. Just as naughty children like to get the better of their parents—it is their only feeble way of asserting their own rights—so adults sometimes like to do that which is forbidden, simply because it is forbidden, and doing it is a gesture of defiance aimed at the substitute parent.

There is, however, another side to the relationship between the individual and the group. It by no means always involves conflict. If there is a social side to our natures, which demands satisfaction, as has been suggested, then we shall not be surprised that many people are content to be submerged in the life of the group, and do not feel any temptation to do anything to vindicate their individuality.

Heard (5, 8) makes the interesting suggestion that we can gain positive strength for carrying on our lives, if we merge ourselves in groups of a certain nature, and he calls attention in this connection to the early Christian " agape " and the witches' " covens." It may be that if we could, in the community of a limited number of persons, merge our individualism, we should not find it such a source of danger and social friction as it is in the Western world. It may be, he suggests, that the absence of weapons among the discoveries in the Indus valley is a sign that the civilisation of Mohenjo-daro and Harappa had found a means of counterbalancing aggressive individualism by some form of collective merging, the forerunner of " yoga " practices.

Whether this be true or not, it is tempting to speculate on the size of the group to which we can feel allegiance. It

raises the question of "humanity." Can we feel allegiance to "humanity" as a whole? Such a question cannot be answered in our present state of knowledge, but it is important for psychologists to realise that the answer to it is a psychological one. The nature and evils of nationalism spring from the nature of the mind of man at the present moment. It is nonsense to put the blame on "economic conditions," because the meaning and force of economic conditions depend on the desires of human beings. If we wanted to be "of one flesh with" all the other people in the world more than we wanted rubber and oil, the economic importance of the latter articles would pale before the value of universal brotherhood. The capacity of humans to transcend tribalism, and feel about other nationals in the same way that they feel about members of their own nations is of the utmost importance for the future history of the world. And in the same way, the capacity of humans to forgo individualistic profit, because they feel strongly about the welfare of other people, is of vital importance for the history of society.

The account which has been given of the social side of man is brief and inadequate, but enough has been said to show how important a study of social psychology is. Indeed there are people who would be prepared to say that a man's behaviour entirely depends on the culture-pattern into which he is born. We may regard this as an exaggerated statement, and at the same time appreciate its force. It is essential that we should realise that to attempt to give an account of the factors which determine behaviour, without mention of the social forces operative, would be hopeless.

Crowd psychology.—The psychology of the crowd has in the past attracted more attention than the psychology of organised groups, and very often the one has been confused with the other. One obvious and all-important feature distinguishes a crowd from a group, and that is the fact that a crowd ceases to be when its members separate, while a group can be a potent force even when not one of the members is in the presence of another. A group must be conceived of

as a relatively persistent organisation, while a crowd is essentially a temporary coagulation.

When a number of people meet in one place because of some common interest, they are liable to be rendered highly suggestible. This is more likely to be the case if the common interest provokes any strong emotion. If, under such circumstances, any one observes signs of, say, fear in his neighbour, he will be liable to become frightened himself, and pass his fear on to some one else, and so it will spread. It will not only spread (" emotional contagion "), but it will increase, so that fear will mount to panic, and anger will reach the heights of rage. If a member of a crowd, in this suggestible condition, listens to the commands of a leader who tells him and his fellow crowd-members to burn, lynch, join the army, roll on the floor or sing " Hallelujah," he will do so, although by himself he might be too self-conscious or too inhibited to do such things. The crowd offers him anonymity, and frees him from responsibility, and therein lies part of its attraction. But, as we have indicated, something else happens. The suggestibility we speak of, can conveniently be looked on as a lowering of the individual critical faculties, and a corresponding openness to accept commands for execution, and propositions for belief.

If rage or fear be aroused by appropriate objects or exhortations, the common emotion suffices to produce the temporary cohesion of a crowd, but if intellectual interests or religious aspirations are the basis of its coming together, then the crowd needs something more to weld it into a unity, which will be strong enough to anæsthetise the individuality of each member.

It is here that the personality of the speaker is important, and he is sometimes preceded by an adjutant who works up crowd feeling for him by making all the people in the room perform the same act at the same time (*e.g.* raise their hymn sheets, or cry aloud) ; this may be followed by rocking to and fro, so that when the audience is thoroughly de-individualised, the preacher can make them quake and tremble whenever he wishes. An appeal to reason must

be avoided, because individual reflection must not be awakened, and therefore a speech which is to rouse crowd-feeling must make use of exciting imagery, frequent repetitions, and a plentiful sprinkling of words which have well-known emotive value.

Other methods can be employed in the artificial generation of crowd-suggestibility. The fixation of attention on to points of light in the darkness, monotonous sounds, and collective ritual action combine to increase the coagulative tendency which is always ready to be exploited whenever a number of people are gathered together.

We have insisted that crowds and organised groups are to be distinguished, but in the life of the group, the phenomena of crowd-psychology may, and frequently do, play a part. A regiment is an organised group, and it has its group symbols: clothing, badges, flags and traditions, but this is not sufficient to reduce the members of the group to a condition of de-individualisation which is requisite for the purposes to which they may be put. Drill, the performance of the same act by large numbers at once, is a technique for further reducing individual questioning by forming the members of the regimental and other military groups into "organised" crowds. It is interesting to consider whether this technique retains its utility under the modern conditions of warfare, when individual initiative is becoming increasingly important.

The actual coming together of a number of people into one place may be a matter of chance, such as a street accident, or a matter of private designs, such as the attendance at a meeting, or it may be that the tendency to seek company, the urge to "huddle," itself, is responsible. In all cases it is likely that the desire to rub shoulders is operative to some extent. This is particularly true of the formation of crowds when a common danger threatens, and in view of the wide-spread damage that can be done in a short time by modern engines of war, this huddling tendency is one which we shall do well to keep under control.

It is distressing to note that the movements in favour of

increased sociability, mass-marches, community-singing, and collective holiday-making go on side by side with the manufacture of instruments, for the protection from which an an individualistic tendency to hide from one's fellows might have higher survival value.

(1) Unwin. Sex and Culture.
(2) Flügel. Man and his Motives.
(3) Isaacs. Social Development in Young Children.
(4) Glover. War, Sadism and Pacifism.
(5) Heard. Source of Civilization.
(6) Heard. Ascent of Humanity.
(7) Durkheim. Les Formes élémentaires de la Vie Religieuse.
(8) Heard. Social Substance of Religion.

Chapter III.

INNATE CONSTITUTION OF MAN.

When we begin to study human beings, we are at first bewildered by the differences we see between one human being and another. They are not only numerically distinct from one another, each person seems to have a quality which no other person possesses, and which does not seem obviously to be made up of a unique combination of qualities which all human beings possess. We see, no doubt, that they seek the same kinds of ends, and that they have fundamental interests in common, but for all that *they themselves* seem to be unique.

In spite of this uniqueness, however, we do find that they can be classified according to various criteria, and the discovery of the most fruitful methods of classification is the subject-matter of such special branches of our science as "psycho-diagnosis," "characterology," the "science of human types" and "psychometry."

In this chapter we shall be concerned with some of the ways in which human beings have been classified, and with some of the tests which have been used for diagnosis.

A. Fourfold Scheme of Temperaments.

One of the most famous ways in which men have been classified is according to a four-fold scheme of temperaments. The word "temperament" itself is somewhat ambiguous. When we speak of the four temperaments we mean general

disposition, while the expression "the temperament" of a person denotes something narrower and even more indefinite—sometimes it refers to sexual excitability, sometimes to histrionic skill, and sometimes to a certain unreliability alleged to be associated with artistic efficiency.

The four temperaments are :

Choleric—supposed to be associated with the yellow gall, the seat of hot and dry fire.
Sanguine—supposed to be associated with the blood, the seat of moist and warm air.
Phlegmatic—supposed to be associated with the phlegm, the seat of cold and wet water.
Melancholic—supposed to be associated with the black gall, the seat of cold and dry earth.

The temperamental characteristics are :

Choleric : passionate, prone to anger, and easily aroused.
Sanguine : enthusiastic and changeable.
Phlegmatic : sluggish and indifferent.
Melancholic : depressed and sad.

This classification is unsatisfactory from a logical point of view because three *fundamenta divisionis* are used : (1) the kind of emotion to which a person is liable, (2) the depth of emotion, and (3) the ease with which an emotion can be roused.

The types were, as indicated above, believed to be due to the preponderance of some bodily humour (Galen, *c.* A.D. 200), but when this theory was abandoned, the fourfold scheme was retained, and many psychologists have been at pains to discover the fundamental factors which lie behind the four types.

Herbart (1, p. 482) :

Sanguine : pleasantly-toned feelings paramount.
Melancholic : unpleasantly-toned feelings paramount.
Choleric : affective and motor excitability strong.
Phlegmatic : affective and motor excitability weak.

Wundt (1, p. 483):

The affective disposition varies along two scales: strong-weak and fast-slow:

Sanguine: fast and weak.
Melancholic: slow and strong.
Choleric: fast and strong.
Phlegmatic: slow and weak.

Ebbinghaus (1, p. 483):

The opponent pairs are: optimistic-pessimistic, and emotive (stormy and vivid)-moody (restrained and enduring):

Sanguine: optimistic and emotive.
Melancholic: pessimistic and moody.
Choleric: pessimistic and emotive.
Phlegmatic: optimistic and moody.

Külpe (1, p. 484):

The temperaments are not all to be interpreted in the same way.

Variations in the *formal* disposition for emotional processes give us:

Sanguine: easy waxing and waning.
Phlegmatic: tendency to indifference.
Choleric: constancy to purpose,

while

Melancholic is distinguished by its *content* of unpleasure.

Ach (2, p. 314):

Here we have three variables: Determining disposition (D.D.), decline of disposition in time, and sensory-motor excitability:

Sanguine: D.D.: strong, decline: rapid.
Choleric: D.D.: weak, sensory-motor excitability: raised.
Melancholic: D.D.: weak, sensory-motor excitability: lowered.

Phlegmatic: D.D.: strong, decline: slow, sensory-motor excitability: weak.
Thoughtful: D.D.: strong, decline: slow.

Meumann (1, p. 485):

Meumann presents us with a complicated scheme which incorporates the fourfold scheme within it. We have the following variables: (1) The feeling-quality may be pleasurable or unpleasurable, (2) the feeling-excitability may be easy or difficult, (3) the feeling-intensity and persistence may be superficial or deep, (4) the feeling may be active or passive.

From a combination of the three last with the first we have:

Sanguine: pleasure—easy excitability.
Phlegmatic: pleasure—difficult excitability.
Choleric: Unpleasure—easy excitability.
Melancholic: unpleasure—difficult excitability.
Frivolous: pleasure—superficial intensity.
Sullen: unpleasure—superficial intensity.
Serene: pleasure—deep intensity.
Serious: unpleasure—deep intensity.
Gay: pleasure—active emotionality.
Enjoying: pleasure—passive emotionality.
Sadly energetic: unpleasure—active emotionality.
Despondent: unpleasure—passive emotionality.

Klages (3) rejects the fourfold scheme; instead of taking a ready-made and outworn theory and trying to refurbish it, he analyses the structure of character and finds three factors which determine it: (1) Personal capacity for stimulation of feelings (C), (2) Personal capacity for stimulation of will (W), and (3) Personal capacity for expression (E).

The value of these factors is, in each case, represented as a ratio between two opponent sub-factors. Thus C grows with increased liveliness of feelings and diminishes with their depth, and therefore the same value of C may be accounted for by great liveliness and moderate depth, or average

liveliness and little depth. Similarly the value of W is a ratio between " urge force " and " emotive inhibition " : an energetic windbag may have average force but little inhibitive energy to keep him steady, while a man who pursues an objective steadfastly may have sufficient inhibitive force to keep him on the lookout for obstacles, and at the same time enough energy to enable him to overcome them.

Lastly, our capacity for expression (E) is represented as the resultant of our excitement and our resistance to expression. Some of us have so much resistance to expression that we do all we can to hide our feelings : such is the case of a person who sees a comic film and admits with embarrassment afterwards that he " couldn't help but laugh " at it.

What emerges from these various schemes is that people differ constitutionally with respect to certain characteristics which can be represented on a scale. Their emotions can be easily or not easily aroused (McDougall and Shand call this " temper "), they persist for longer or shorter times (*cf.* " perseveration " below), they are superficial or deep and so forth. These are *formal* characteristics and are not concerned with the *content* of the emotion felt.

The schema proposed by Heymans (1, p. 484) has achieved a certain distinction. The variables are : emotional-unemotional, active-inactive, preponderance of primary or secondary functions. (*Cf.* reference to Gross, p. 60) :

(*a*)	" nervous type " :	emotional ;	inactive ;	primary function ;
(*b*)	" sentimental " :	,,	,,	secondary function ;
(*c*)	" sanguine " :	unemotional ;	active ;	primary function ;
(*d*)	" phlegmatic " :	,,	,,	secondary function ;
(*e*)	" choleric " :	emotional ;	active ;	primary function ;
(*f*)	" passionate " :	,,	,,	secondary function ;
(*g*)	" amorphous " :	unemotional ;	inactive ;	primary function ;
(*h*)	" apathetic " :	,,	,,	secondary function.

Finally we should mention the classification proposed by Spranger (4). This is derived from the standpoint known as *Geisteswissenschaft*, from which the individual is seen in his social setting, not as a member of a class, but as

having certain values which he regards as of paramount importance, and which determine his activity:

(*a*) Theoretical. A tendency to live in accordance with ideas and ideals.

(*b*) Economic. A tendency to consider the use-value of an action.

(*c*) Æsthetic. A tendency to transform impression into expression.

(*d*) Social. The consideration of the welfare of society dominates the scene.

(*e*) Political. A tendency towards self-affirmation.

(*f*) Religious. Concentrated on bringing about certain experiences judged to be of paramount value.

B. Types Derived from Experimentation.

Experimental psychologists have classified their subjects according to their responses when asked to perform simple tasks. The following are some of the methods which have been employed:

(1) Method: reaction time. Reaction times are found to differ according to whether the subject is attending to the act he has to perform or to the stimulus to which he has to respond. Thus we have two types: "sensory" and "motor," indicated by the attitude taken up in these tests.

(2) Similarly it has been found that in experiments on threshold determination some subjects attend to the stimulus the whole time, and some have their judgments disturbed by expectation and fatigue.

(3) The subjects have to describe something, and are classified in terms of the method they employ in their descriptions.

Henri (1, p. 206) divided his subjects into:

(*a*) Descriptive—simple catalogue, of items;
(*b*) Observant—connects parts with whole;
(*c*) Emotional—brings in emotional response;
(*d*) Learned—brings in knowledge.

These types were derived from the description of a picture.

Cohn and Dieffenbacher (1, p. 210) made their subjects describe what they had seen on a railway station, and they divide them up according to whether they: (*a*) give an unrelated list of details, (*b*) seem to be more interested in their own personal experience, (*c*) give a connected account of the goings-on at the station, or (*d*) bring in ethical or sociological reflections.

Other psychologists have made similar experiments, and based similar classifications on them. Sometimes, they have multiplied the number of types to as many as seven (*e.g.* Leclère).

The simplest differentiation of this kind is that suggested by Binet (5) who performed experiments like these on his two daughters, and found that they differed with respect to the qualities of "imaginativeness" and "matter-of-fact-ness."

It may be said that the classification of descriptions and the naming of types in accordance with such a classification is of little use, unless we can find out what underlies the differences observed. Are there not underlying attitudes which can be fitted into a more general plan of what human-beings are like?

The answer to this question takes the form of pointing out that there is a fundamental difference between an attitude that is directed outward, and one that is more absorbed in itself, and thus we get the distinction between the "subjective" and the "objective" types of people. These two attitudes can be regarded as corresponding to the biological interests of the organism, and the distinction between those people who described objectively, and those people whose descriptions manifested "subjective" activities would be more important than the difference between those people whose subjective activities were of an emotional nature and those whose subjective activities were more intellectual.

This distinction between an objective orientation and a

subjective has been made by a great many psychologists, and we have a variety of :

C. Two-Fold Schemes.

Before embarking on instances of this method of classification we must notice an important characteristic of them. The two anti-types are opposed to one another, in a way that the members of the fourfold scheme do not. It is true that a sanguine man may get on the nerves of the melancholic, but there is no inherent and inevitable opposition, whereas the two types in each of the two-fold schemes we are about to consider are thought of as inevitably clashing, and we shall find the suggestion made that each man has both qualities in him and has only developed one, so that he is in conflict not only with people who belong to his opposing type, but also with part of himself.

William James (6) points out that : " The history of philosophy is to a great extent that of a certain clash of human temperaments." The clash is between the tender minded and the tough minded.

We have the following table :

Tender Minded.	*Tough Minded.*
Rationalistic (going by principles).	Empiricist (going by facts).
Intellectualistic.	Sensationalistic.
Idealistic	Materialistic.
Religious.	Irreligious.
Free-willist.	Fatalistic.
Monistic.	Pluralistic.
Dogmatical.	Sceptical.

Nietzsche (7) discriminates two tendencies : the Apollonian and the Dionysian. The name of the former is taken from " the god of all shaping faculties," and those who are possessed by him impose orderliness on everything savage and untamed ; their central ruling power must be

left intact at all costs. Such people are liable to be distressed by the adherents of Dionysius, who represents unbridled instinct tending towards frenzy.

Ostwald in " Grösse Männer " compares the biographies of certain famous scientists and discovers two types of character : the Romantics who are guided by their outward-turned natures to flit from object to object, and the Classics who are pre-occupied with perfecting their thought and safeguarding themselves from error. The nomenclature used here is interesting ; we are apt to forget the subjective accent in literary classicism and the objective, outward-turned element in literary romanticism. The concept of the romantic in literary criticism is inclined to be vague ; it may refer to a return to nature, in which the outward turned attitude is obvious, or it may indicate phantasy production which has but little to do with the outside world.

Gross (8) developed a theory of neural functions from which he derived two opposing types. A " primary function " takes place when, say, a perception is registered, and after that reverberations (" secondary functions ") are set going and may go on for a longer or shorter time. If they go on for a short time the organism is free to respond again, but if they persist (or perseverate) for a long time the organism is preoccupied with its secondary functions and what subsequently happens will be modified by these disturbances going on inside him. He thus derives " inferiority with shallow consciousness " and " inferiority with contracted consciousness " corresponding respectively with the extremes of these two possibilities.

Jung (9) has produced the most famous modern bi-polar classification. His two opposed orientations are " extrovert " and " introvert," and anyone who, in his conscious and behavioural life is extrovert (or introvert) is, without his knowing it, also swayed by unconscious efforts to effect a balance on the part of the introvert (or extrovert) side of his nature.

The picture is, however, further complicated by an analysis of the basic psychic functions into four : thinking,

feeling, sensation and intuition, any one of which may be predominant in either the extrovert or the introvert. This provides us with eight types:

(1) Extrovert-thinking: Thought orientated by objective data or generally accepted ideas.

Unconscious influence: neglected self-regarding introversion gives rise to a secret sensitivity and suspiciousness.

(2) Extrovert-feeling: Emotional responses suitable and adapted to the external situation.

Unconscious influence: Disconcerting doubts are liable to arise about the most cherished feeling-values.

(3) Extrovert-sensation: "His life is an accumulation of actual experiences with concrete objects."

Unconscious influence: The more he gives himself up to sensation, the more likely is he to "intuite" all kinds of magical hidden possibilities.

(4) Extrovert intuitive. (For Jung "intuition" is "a kind of instinctive apprehension.") "He has a keen nose for things in the bud, pregnant with promise."

Unconscious influence: his undeveloped sensation faculty may bind him to some worthless and unsuitable object.

(5) Introverted thinking: Thought determined by subjective ideas.

Unconscious influence: the more he tries to shut himself up, the more insistently frightening the outer world appears.

(6) Introverted feeling: Outwardly indifferent, he is internally a whirlpool of subjectively determined feelings.

Unconscious influence: Outward-regarding thinking function causes apprehensive speculation about what others are thinking.

(7) Introverted sensation: preoccupied with the sensations provided by objects, and tending to depreciate the objects themselves.

Unconscious influence: Extraverted intuition scents dangers and unpleasantness.

(8) Introverted intuitive: The mystical dreamer or the fantastical crank and artist.

Unconscious influence: The more contemplative he becomes, the more likely to form some impulsive attachment to an external object.

Kretschmer in his "Physique and Character" (10) has correlated two opponent types with certain physiological characteristics. His two types are: Schizoid (correlated with an athletic or an asthenic physique) which roughly corresponds to Jung's introvert type, and Cycloid (correlated with a fat round "pyknic" physique) which roughly corresponds to Jung's extrovert type.

Rorschach (11) has devised a test for temperamental characteristics which consists in showing subjects coloured blots and asking them what they "see in" the forms placed before them. There is a complicated system of evaluation of their replies, and on a basis of this he has discriminated three types:

Extratensive—people affectively in contact with the outside world.

Introversive—people who find difficulty in making such contact.

Coartive—people who have equally repressed their internal lives and their external contacts.

Oeser (12) has recently performed a series of experiments which confirm the theory that people tend to differ with respect to the tendency to "go by" colour as opposed to the tendency to "go by" form. People who do jig-saw puzzles will be familiar with instances of this distinction. He found that the "colour type" tend to be "more delicately balanced," more easily put out, and more enthusiastic than the "form type," whose attitude is more objective. It is interesting to note that "more children are colour abstractors than form abstractors" (p. 201).

Jaensch (13) discovered that people who have "eidetic imagery" (see p. 321) vary with respect to the degree to which the "eidetic" image resembles the "after-image." In some cases the "eidetic imagery" depends very much on the subject's having an adequate attitude, and being in a

certain physiological condition ; the colours tend to be complementary, and the image is felt to be something alien to the personality. This Jaensch calls the " Tetanoid type " because he finds certain resemblances between characteristics of such subjects and the clinical condition of " tetany." The opposed type do not feel the " eidetic image " as outside or foreign to the personality, and the " images " themselves are coloured like the original ; fixation is not necessary for their perception, and their content can be changed by thinking of it as being different. This type he calls the " Basedow type," because of similarities between these subjects and patients suffering from " Basedow's disease."

These two types, the " T-type " and the " B-type," he believes to be extreme forms of two fundamental forms of personality : the " Disintegrate " and the " Integrate " respectively. The former does not take the perceptual data into himself, but rather stands over against it ; the mental functions are relatively dissociated from one another. The latter, the " integrate type," is one in which the perceptual apparatus is more closely integrated with the rest of the personality, so that the " behavioural world " is more suffused with the rest of the perceiver's nature.

This is an interesting line to take up, in view of the fact, of which we continually have to remind ourselves, that to an important extent we are the manufacturers of the world in which we live.

D. Other Temperamental Traits and Tests.

Perseveration.—The notion of " perseveration " is associated with the name of G. E. Müller. In his work on memory he noticed that items which have occurred in consciousness seem to perseverate and return after their work has, as it were, been done. This is a perfectly familiar experience ; a tune will run in one's head and one often cannot get an idea out of one's mind. In the language of the " Gestalt " psychologists, when a state of tension is established, it tends to achieve equilibrium, a pattern of activity which has been

started tends to complete itself, with the result that when we try to do something else, *i.e.* when a new state of tension is set up, the old pattern still goes on seeking completion. In the language of " primary functions " and " secondary functions," the " secondary function " may go rumbling and ramifying long after other " primary functions " have been set going.

From a biological point of view it is obvious that a certain persistence of a train of action is essential ; we must be able to continue along one path for a certain length of time and not be diverted by every stimulus that tries to make us swerve from our path, and, on the other hand, we must be sufficiently plastic to be able to move on to the next task when one task is finished.

Now it appears that people vary with respect to their ability to " switch " from one subject to another. This, again, is only too familiar : some people cannot keep up a consecutive train of thought for more than a few minutes, while others cannot leave a subject alone, once it has been started. It is, too, a characteristic which varies in us from time to time : the drunkard comes back and back again to the same old grievance when we have thought we have successfully headed him off in a less dreary direction.

Tests have been devised to measure this trait.

The subject is told to write the letter " S " as fast as he can for half a minute, and then " S " backwards for half a minute, then right way again followed by backwards again, each for half a minute, then he is told to write alternate right way and backwards way " S's " for two minutes. The same can be done with " a, b, c, d, e, f, g, a, b, c . . . followed by " 1, 2, 3, 4, 5, 6, 7, . . .," and then a, 1, b, 2, c, 3, d, 4, e, 5, f, 6, g, 7, a, 1, b, 2, ..."

The question is : to what extent is he capable of switching from one task, *e.g.* writing an " S " the right way round to writing the next " S " the wrong way round, granted that he has had a certain practice in doing both.

Extreme perseverators and extreme non-perseverators are said to be obstinate and " difficult," and to lack self-

control and perseverance. The former are said to be serious, and shy, while the latter are said to be less refined, suspicious, anxious, irritable and selfish. Moderate perseverators are said to be normally balanced persons.

" *W.*" Webb, using the mathematical technique described below (tetrad equations, see p. 73) on character estimates, claims to have established a factor responsible for " profoundness of apprehension " and " common sense," which he proposes to call " W," and which is said to be " in some close relation to ' persistence of motives.' "

We are now in the realm of unitary characterological factors, and it is in connection with the establishments of such traits as *sui generis* determinants of character that the London School technique of investigation has been of importance.

" *C.*" Working on Webb's material, Garnett suggests that there is another factor responsible for " quickness " and " originality," which he proposes to call " C " (for Cleverness). It is possible that this is the reverse of the inertia measured in tests for perseveration.

Cattell calls the temperament which might be supposed to lie behind the presence of a high " C," " surgent," a term which " conveys the idea of ' leaping ' or ' rising up ' with facility " (14), while the opposite of this he calls " desurgent."

Handwriting.—It has frequently been held that handwriting can be used for diagnostic purposes. There are, it is true, theoretical reasons which support this contention. If the organism tends to work as an organised unity, then all of its skills will partake of a flavour peculiar to the organism to whom they " belong," and just as a few lines of a poem might set the pattern to which the rest had to conform, so, it might be held, a few strokes of the pen might be the result of innervations which only an organism built on a certain plan could produce. This paves the way for the use of handwriting analysis for the purpose of detecting forgery, and it is in this field that Saudek (15) has been so successful. It is obviously harder to correlate the formation of letters in

a certain way with the possession of certain character traits, but some of the inferences made along these lines are striking enough to be taken seriously.

In this connection it is interesting to note that Richet found that when an artificial personality was produced under hypnosis, the handwriting was often changed to suit the character of the personality which was dominating the field.

Another use of handwriting for characterological diagnosis is that employed by Downey (16):

Will-temperament tests.—A test for speed discriminates the quick fluid type from the cautious and deliberate; a test involving resistance to contradiction brings out forcefulness and decisiveness; while slow writing and exact copying call for a display of carefulness and persistence. M. D. Vernon (17) compiled a series of performance tests: a small steel ball is chased up an incline plane with a knitting needle; a lock and door handle has to be assembled; fifteen badly cut cubes have to be piled on top of one another, and so forth. From the results—the way in which failure is met, the degree to which temper is roused—Vernon believes that certain characterological traits can be inferred.

Cheating tests.—*E.g.* candidates required to trace mazes with their eyes shut; a task, whose achievement is impossible, is presented and success arouses suspicion.

Moral vocabulary.—Mainly an American method; the material is sometimes instructive to English readers: *e.g.* candidates are asked to underline the correct answer to: "To be stewed means: drunk, cooked, tanked, batty."

Moral judgments.—Lists of offences to be arranged in order of wickedness; giving right answer to moral questions, *e.g.*:

If you make a mistake and put a nickel for a penny in the slot machine:

(*a*) Put in four slugs to even it up.
(*b*) Call up the company and tell them about it.
(*c*) Smash the thing and get your nickel.
(*d*) Report it to the police.
(*e*) Do nothing.

Optional question papers.—Watts (18) prepared question papers with optional questions, and inference as to the characters of the candidates is drawn from their choice.

Fear and aggressiveness.—Moore and Gilliland (19) devised tests for these qualities by making the subject "stare out" the tester, or noting the distractive influence of some alarming factor introduced while they are engaged on a task.

Inventory.—A list of significant questions may be compiled and the answers of subjects noted. Such "inventories" have been made up by Woodworth (20), Burt (21), and Laird (22).

Rating.—A list of temperamental characteristics is made out and then five determinate values are indicated.

E.g. Disposition: decidedly ill-natured; easily vexed, average self-control; rarely vexed, exceptional self-control.

There are, as may be imagined, many varieties of this method. The point of a scale is that it provides one with a relatively large number of pigeon-holes in which to place one's subject, and thus make assessment more easy.

Final assessment.—When the value of the qualities which have been measured has been ascertained to the satisfaction of the tester, a "profile" or "psychograph" is drawn to give graphic representation of the result. The usual course is to choose certain characteristics which are considered to be of importance and draw the "profile" from the degree to which the subject is judged to be possessed of them. Too large a number of traits makes the profile unwieldy for practical purposes.

The Interview.—Psychologists in England, who are engaged in giving Vocational Guidance advice rely on a carefully planned interview rather than on the achievement of the candidate in any temperamental tests. Such is the procedure of the National Institute of Industrial Psychology in this country.

E. Intelligence Testing.

Of all human characteristics, the one which has attracted most attention during the present century in the Western

world is " intelligence." In 1883 Galton published his " Enquiries into Human Faculty," in which he suggested that intelligence is measurable, and in 1890 Professor Cattell published an article in *Mind* on " Mental Tests and Measurements."

This was the beginning, and since then the volume of literature on the subject has swelled to a prodigious size. The methods of approach are various, and there is difference of opinion on almost every point.

I. One course which may be taken is to start with the notion of intelligence, define it, analyse it, and proceed to devise tests for its measurement. This sounds easy enough, but the variety of definitions of intelligence which have been submitted indicates that there are unexpected difficulties. We all make judgments about other people's " intelligence," " wits," " nous," " sense " and " ability to see the point of an argument," but when we come to look into our idea of the quality we are referring to we find ourselves able to say what it is *not*, but hard put to it to say what it *is*.

We do *not* mean information or acquired skill even though we may have to admit that " intelligence " is needed for the acquirement of both ; it is not paradoxical to say of a well-informed person that he is not particularly intelligent. We do *not* refer to any special aptitude, such as mathematical ability ; we have all met mathematicians whose intelligence we despise. We do *not* mean to refer to any temperamental, moral or characterological quality ; though we may agree that persistence in the overcoming of obstacles is a useful trait if a person is going to make the best use of what intelligence he has, we do not necessarily deny intelligence to those who are temperamentally rather unstable.

There are two main ways in which a definition of intelligence has been sought : (*a*) by reference to its function, and (*b*) by describing what we are doing when we are admittedly making use of our intelligences.

(*a*) The commonest variety of this kind of definition is that supplied by Stern (23, p. 127), who says that it is " general adaptability to new problems and conditions of

life." Such a definition springs from an interest in the biological aspect of psychology.

Some creatures, as we have seen, respond mechanically to certain stimuli, whereas others are able to adapt their behaviour to meet slight changes in an otherwise familiar environment. We say that in doing so they display "intelligence." Unfortunately, however, the word "intelligence" is associated in our minds with certain conscious processes, such as "reasoning" or "judgment," and when we attribute "intelligence" to animals who solve the problems we set them, we are apt to assume that they are having experiences which are like those which we have when we are using our reasoning powers; and, conversely, it seems paradoxical to say that when a testee is answering a question in an "intelligence test" such as: "Coal is to black as snow is to— ?" he is making a conscious adaptation to a new situation. As Professor Spearman has pointed out, the concept "situation" is itself imprecise.

Under this heading come such definitions as: "The power of good response from the point of view of truth" (Thorndike), "The ability to act effectively under given conditions" (Buckingham), and "That which can be judged by the degree of incompleteness of the alternatives in the trial and error life of the individual" (Thurstone).

(*b*) The other important kind of definition aims at an analysis of processes, which common sense would certainly associate with "intelligence." Typical of such definitions is that given by Knight (24, p. 17), "Intelligence is the ability, when we have some aim or question in mind, (*a*) to discover the relevant qualities and relations of the objects or ideas that are before us, and (*b*) to evoke other relevant ideas." With this may be ranged Wyatt's differentiation between the intelligent and the unintelligent: "One apprehends the relevant relations, the other does not," and Terman's statement that "An individual is intelligent in proportion as he is able to carry on abstract thinking."

It is this attitude towards intelligence, the view that it displays itself in the perception of relations (or "eduction

of relations "—Spearman), and particularly in the perception of relations presented through the medium of language that lies behind an enormous number of intelligence tests.

E.g. : Complete the series 3 4 6 9 13 18 — —

Absurdities : A householder saw an advertisement : " Buy one of Simkin's stoves and save half your coal." He bought two in order to save all of it.

Mixed sentences : Little can many skip girls.

Synonyms : Portion means the same as : *Part*, *game*, *colour*, *eatable*.

Classification : *Shoot*, *stab*, *paint*, *choke* (the odd word to be underlined).

Analogies : Piano is to tune as pencil is to : *Trumpet*, *sketch*, *pen*, *rubber*.

In the last three the candidate has to underline one of the words in italics.

Now if we confine ourselves for the moment to a consideration of these tests the following points seem fairly clear :

(1) They involve the perception of relations, and when the correlative in the analogies test and the number series test is not given, they involve the " evoking of other relevant ideas " (" eduction of correlates "—Spearman).

(2) We should regard persons of a certain age or over as unintelligent who could not solve them.

(3) Their solution is a piece of thinking.

But if the essence of intelligence is the perception of relations, why should we limit the relations we require testees to " perceive " to those presented in words ? Surely the perception of relations is involved in the solution of practical problems which deal with concrete objects as well, and, further, may not those who have but little linguistic facility be penalised ? This is admitted ; in fact Wyatt's distinction between the intelligent and the unintelligent man, quoted above, is actually made with reference to their respective abilities in the assembly of parts of an automobile. We are

not surprised, therefore, to find that tests have been devised for the measurement of people's ability to perceive relations, and evoke relevant ideas, when faced with problems presented not in language but concerned with the manipulation of objects.

Examples of such " performance " tests are :

Cube construction : A form has to be constructed out of nine cubes in imitation of one which lies in front of the testee.

Dearborn formboard : Shapes which fit into slots on a board have to be changed about to make room for shapes which have been removed.

Healey completion : A picture on a board has holes in it which have to be filled from a collection of small pictures on blocks made to fit into the holes.

Thus we see that the two definitions above are not contradictory, for an animal must perceive relevant relations in any " new " situation if it is going to make an adaptative rather than a stereotyped response.

The word " intelligence " is, as Spearman puts it, " cankered with equivocality," but there seems general agreement, which is brought out in ordinary usage, that it does operate in the perception of relations and production of relevant correlates. It may be used by humans in intellectual problems or in practical problems, and whether we attribute it to animals depends on whether we use it as a " functional " concept, or as a " descriptive " one. The distinction between these is of great importance. If " intelligence " is a *functional*-concept, it denotes that factor or those factors which are responsible for the perception of relations in the intellectual or practical fields ; as such it is applicable to animals if we decide that in some sense or other they perceive relations. If, however, we have in our minds, not that which makes us perceive relations, but the actual perceiving of them as we *experience* it, then " intelligence " is a *descriptive* concept, and it is rash to apply it to creatures other than human. Common speech favours both usages, but on the whole the latter is to be preferred.

We can now ask what factor or factors in us are operating when we " intelligise "—if so ugly a verb may be forgiven. Is the same factor responsible for the perception of relations in both the intellectual and the practical fields ? In the intellectual field itself, is the same factor responsible for all the problems solved ?

There are two views on this subject :

A. According to Thorndike and Thompson intelligence consists of a number of innate abilities. This view is shared by the German psychologist, Ziehen. Binet also has been classed as one holding this type of theory. In an article on "The Intelligence of the Feeble-minded" (25) he indicates that intelligence involves at least three faculties : (1) the appreciation of a problem and the due direction of the mind towards its execution, (2) the capacity for making the necessary adaptations to secure a definite end, and (3) the power of self-criticism. Binet's analysis, however, does not go so far as that of the other psychologists who come under this heading ; for them there are various factors which come into play from situation to situation in the very " appreciation of a problem."

Such a view as this is in accord with the belief of common sense that some people are good at one thing and some at another, and that such variations spring from innate differences. Both Ziehen and Thorndike, however, agree that over a significantly wide field, people who are good at solving one kind of problem will be good at solving another.

The suggestion that there are a number of independent factors at work has led to the compilation of collections of tests which aim at measuring " general " or " all-round " ability, by taking an average sample of their various capacities.

B. According to Spearman and Burt there is only one factor which is responsible for our intelligising.

Before we can understand Spearman's view certain technical terms will have to be explained.

Supposing you give two tests to the same class of children, there are two opposed possibilities : the order of the children

in the results might be exactly the same (perfect positive correlation), or the order of achievement in the second test might be exactly the reverse of the order obtained from the first (perfect negative correlation). Such results are, however, extremely improbable. The two lists are not likely to " fit " exactly either positively or negatively. You might have a pair of orders in which the first in A was second in B and the ninth in A was seventh in B, in which, that is to say, the orders nearly fitted, or you might have a pair of orders so different from one another that you could point to no tendency to fit, either positive or negative. In fact, between perfect positive correlation and perfect negative correlation there are degrees of " fit " which could be ranged along a scale. Mathematicians construct such a scale by representing perfect positive correlation by 1 and perfect negative correlation by − 1 and no correlation by 0. They have further developed a technique for discovering whereabouts on this scale any pair of orders will lie with respect to their " fit."

The position of the " fit " of a pair along this scale is called the *correlation coefficient*, and if it is high and positive we infer that a person who does well in the one task is likely to do well in the other, and that there is some connection between the faculties which are employed in the two performances.

Now if you give a number of tests to the same group, you can easily obtain the correlation coefficients between all the pairs, and Spearman made the extraordinary discovery that when the tests involve cognition or knowing, the correlation coefficients can be arranged in accordance with a certain mathematical pattern.

Take four tests, A, B, C and D, find the correlation coefficients between A and B, C and D, A and D, and B and C, multiply the first pair of correlation coefficients and multiply the second pair, subtract the products and the result will be very nearly 0. This is expressed as follows: $(r_{ab} \times r_{cd}) - (r_{ad} \times r_{bc}) = 0$ and is called the " tetrad equation."

The next step was to prove mathematically that when this happens, each *score* in each test can be split into two factors, such that one is constant for all the scores of the same person in the correlated tests, while the other will vary from test to test. The constant factor he calls " g," the variable one " s." Each person may have a different " g " from his colleagues, which will remain constant throughout his scores, and he will have a different " s " for each score.

Spearman considers that this value " g " measures some general factor which functions in all mental activity, whether intellectual or perceptual, while " s " is the measure of various adventitious factors which play a part in determining a person's ability in any *particular* test; *e.g.* the nature of his motor and sensory apparatus, the power he possesses to retain impressions of a certain kind, etc.

" g " is not identified with " intelligence," though there are passages in Spearman's " Abilities of Man " which would seem to support such an identification; " g " is identified tentatively with innate mental energy, or, as Burt expresses it " inborn, all-round mental efficiency," and mathematical proof is submitted to show that what, from a descriptive point of view, would be called intelligence tests are " highly saturated with ' g '."

This technique is also used to establish the existence of certain special abilities in the possession of which people may differ. When the tetrad equation does *not* have a value closely approximating to o, this is taken to be a sign of some special ability at work in the tests whose results are correlated. Such special abilities (" group factors "), are: musical ability, logical ability, mechanical ability and arithmetical ability.

A point of practical importance which emerges from Spearman's work is that the specific abilities are narrow in their range, which means that if a test is designed to measure the candidate's ability with respect to a given task—say in industry—the test itself must be extremely *like* the task in question.

Mechanical ability.—Does capacity to understand and manipulate mechanical devices constitute a special factor? It is, of course, clear that "general intelligence" is involved in invention and in the understanding of the working of mechanical objects, but there seems to be a specific ability which is not highly correlated with "G." Stenquist has elaborated tests for mechanical aptitude, and more recently Cox (26 and 27) has analysed the capacities of subjects to solve his mechanical tests into: a general factor, a "mechanical factor" ("m"), which helps with mechanical aptitude and mechanical assembling, a "routine manual" factor "restricted to the routine assembling and stripping operations and the simple manual tests, and two small additional factors each restricted to a pair of the simple manual tests involving closely similar movements" ("Manual Skill," p. 235).

Musical ability.—Musical ability has excited considerable attention. The most celebrated tests are those compiled by Seashore (28).

These are for pitch, intensity, time, consonance, rhythm and tonal memory. It is true that sensitivity to these characteristics is not necessarily highly correlated from characteristic to characteristic, but proficient musicians have these sensitivities highly developed, and there is no correlation between high marks in these tests and high marks in intelligence. This, again, does not mean that musical talent is only to be found among the intellectually dull; it only means that intellectual eminence is not necessary for musical proficiency.

All theories which are based on the measurement of correlations have to be considered in the light of probability calculations. The position is this: in human and sociological phenomena so many factors are at work that the isolation of any one of them for measurement is impossible. Only by taking a large number of measurements and comparing them, can we detect the causes whose action in isolated cases may be masked. We may think there is "something in" our suggestion, but how do we know that the connection

on which we base our inference is not due to chance? The mathematics of pure probability provide us with a corrective; with their help we can estimate what correlations and favourable measurements we ought to obtain if there were *no* factor operative such as we are suggesting—*i.e.* if the observed connections were due to chance, and therefore the measurements which we produce in support of our submissions must surpass the probability measurements if we are to establish our thesis.

In the case we are discussing, the mathematicians disagree. Thompson holds that the tetrad equation is just what would result from a chance-wise connection between several independent intellectual abilities.

II. Another approach is to ask what can be expected of normal children of a given age. This leads to the conception of "mental age" and "intelligence quotient," or I.Q.

The most celebrated series of tests, adapted by experiment for various ages, is the Binet-Simon scale, published in 1905. In 1904 Binet made a survey of Parisian schools in order to detect feeble-minded children. This obviously meant finding out what the average child could do. The following are examples taken from the groups of tests for the ages indicated:

3 years: Shows nose, eyes and mouth.
4 years: Repeats sentence (6 to 8 syllables).
5 years: Repeats 4 numbers (once out of 3 trials).
7 years: Adds 3 pennies and 3 halfpennies.
11 years: Gives 60 words in 3 minutes.

(The above examples are taken from Burt's modification of the Binet-Simon scale (21, p. 349).)

The child is given the groups of tests for successive ages until he fails in a problem included in a group. His "base" age is given by the last entire group of tests which he has passed successfully, and then he is credited with additional months for each test out of groups above, which he manages to perform correctly. The result is his "mental age" and his "Intelligence quotient" or "I.Q." is obtained by his mental age divided by his real age and multiplied by 100.

We have now a scale against which we can measure mental deficiency. The " mentally deficient " have I.Q.'s below 70, while the " Dull " child is defined by Burt (21, 117) as having a mental ratio of 70-85, and the backward child as having an *educational ratio* of less than 85. This last is calculated in the same way as the I.Q. or " mental ratio," from a test scale of educational attainments.

A curious fact emerges when intelligence tests are given to groups of children of ascending ages. Up to about 16 the groups score increasing numbers of marks, but when you get to 16 and over, the test results keep to a certain level and there is no further improvement. This has been taken to show that our intelligence develops up to this age, and then stops developing. There seems a great deal of experimental evidence in support of such a view, but some psychologists are inclined to say that although we may not develop in our ability to score more marks in intelligence tests which have been devised so far, we might do better in harder tests than adolescents of 16. If Spearman is right, however, *any* test which measures " g " will serve to measure it at any age, and therefore we cannot appeal from the tests provided to a higher and severer court. The discussion is hampered by the natural desire of the adult to think of himself as necessarily more intelligent than he was when he was 16, and the difficulty we have in discriminating between " innate mental energy " and those qualities which may be developed in later life, and which make for success in various occupations, without revealing themselves in the test situation ; all such qualities, since they do make for success, are liable to come under the popular conception of intelligence, because in the Western world " intelligence " is always a desirable quality to possess.

In the testing of tests themselves, several conditions have to be satisfied if a test is to be acceptable. (1) The test must not be too easy or too difficult ; it must be such that few candidates get few marks, many get about half marks, and few get a great many marks. If the scores of the candidates on whom the test itself is tested are manipulated in a

certain way with respect to the frequency of their occurrence and their actual values they can be placed along a scale ranging from 1 (worst score) through 50 (average) to 100. This is called " percentile ranking," and any subsequent score obtained by giving the test can be estimated by its position along such a scale.

(2) The results of the test can be compared with some other estimate, such as teacher's estimates of ability, or class position, and a high correlation with these is expected of a test which is under review.

(3) The Spearman mathematical technique may be introduced to discover how far a given test is " saturated " with " g."

The actual series of tests compiled by Binet and Simon have been criticised from various points of view, and the following are among revisions which have been made: Vineland Revision (Goddard 1911), Yerkes point-scale; Stanford Revision (Terman); London Revision; Treves-Saffiotti Method (Italian); De Sanctis Tests for discriminating mental defect.

The following " Group Tests " should also be noticed: Terman; Otis; National Intelligence; National Institute of Industrial Psychology; American Alpha.

There is no doubt that certain negative inferences can be drawn from the results of applying tests. No one who has used them can help being surprised at the failures to solve simple problems. How far they enable us to make positive judgments is a matter widely disputed. Even the negative judgment, however, has been disputed. Trabue (29) cites the case of a housekeeper in charge of fifty maids, three carpenters, two decorators and a plumber who did badly in the tests to which she was submitted. Whether we are to say that a person, who is able to perform such duties as she had to, nevertheless has but little intelligence, depends as usual on the meaning we attach to the word. In any case it would seem that we should not take low test results as indicative of unsuitability for all complicated jobs. It is further alleged that brilliant and success-

ful men often fail to gain high marks in intelligence tests, but the evidence for this has been disputed.

Supposing, however, we have a candidate who obtains a high mark; we do know what he can do, what he has done, but we do not know how much more he could do, neither do we know what went on in his mind when he did the test. In one of the Columbian Group Tests the candidate is required to mark the right answer in the following problem. When a little girl loses her doll she should:

A. Cry till somebody finds it for her.
B. Think where she is likely to have left it and look there.
C. Search in her father's pockets.
D. Ask her mother to buy her a new one.

One mark is given for the answer B. Each answer, however, has much to be said for it, and could be "intelligently" justified. The alternative, "it depends," is not given. Any answer other than B gets no marks, though B may have been rejected in favour of A on the grounds of the saving of energy involved. A virtuous dull child might get a mark for answering B, but we could not distinguish his answer from the B of the child who gave it because he thought it was just the kind of answer a schoolmaster would approve. The point is that from the performance itself we cannot infer the processes that went on to produce it.

Racial differences.—America, with its mixed population, has naturally been the field of investigation into the problem of racial differences in intelligence. The results of Army Alpha tests, applied to recruits of different nationality have been investigated by Brigham (30) and he found that the percentages of each nationality that exceeded the average native white American was as follows: England 63; Scotland 59; Holland 58; Germany 49; Denmark 48; Canada 47; Sweden 42; Norway 37; Belgium 35; Austria 28; Ireland 26; Turkey 25; Greece 21; Russia 19; Italy 14; Poland 12.

Brown (31) applied Binet-Stanford tests to a mixed population and the results were:

Country.	*No. of Cases.*	*Median I.Q.*
Norway	34	103
England	90	102
Germany	67	102
Sweden	187	102
Austria	28	99
France	199	95
Finland	226	90
Slovakia	31	86
Italy	51	77

Further experiments have been made on a large scale by Berry (32) in Detroit.

Pressey and Teter (33) compared the test results of 120 coloured American children with those of 2000 white children and found that the coloured children were about 2 years behind the white.

Of course all comparison between the results of testing people who belong to different countries is risky. Where different nationals live in the same country they may not be representative of the nations from which they come, and the tests suitable for one country may not be suitable for another. It is impossible to exclude experiential material in tests; after all the tests have to present problems in language and the very understanding of the commands is the result of "experience." This means that a test which may be of use for one cultural background may not be valid for another.

Inheritance of intelligence.—The question of the inheritance of intelligence has been dealt with in three ways:

(1) The correlation between the test results of identical twins (·90), like sex twins (·82), ordinary brother and sister (·50) and unrelated children (·00) have been compared, and it will be seen that there are grounds for inferring inheritance.

(2) The intelligence of children has been correlated with that of their parents. Burt (34) found that the children of men who had attained to some degree of intellectual emin-

ence did better at the tests than sons of local tradesmen attending elementary schools, though the better scores of the former could not be put down to their having been better taught.

Pressey and Ralston (34) compared the achievement of 500 children with their fathers' vocations and found that on the whole those who did well in the tests were children of fathers engaged in professional or executive work.

Such comparisons are open to criticism on the ground that the children who come from intellectual homes may have a better chance of developing their intelligence than those who come from less intellectual ones.

(3) In view of the last-mentioned objection, an investigation was carried out by Dr. Evelyn M. Lawrence (35) on children coming from various social classes, who were inmates from an early age in a charitable institute, and therefore all enjoyed the same environmental influences. She found that there is a significant correlation between the intelligence of such children and the social class from which they come.

Of course such investigations reveal only a general tendency; their results do not mean that children of intelligent parents will never turn out to be dullards, nor, again, that persons who occupy relatively humble positions in our culture-pattern may not be intelligent and have intelligent children. It is impossible, at our stage of knowledge, to say whether, for example, D. H. Lawrence inherited his intelligence from his mother, or whether he was a "sport" in the biological sense.

(1) Stern. Die Differentielle Psychologie.
(2) Ach. Uber Willensakt und Temperament.
(3) Klages. Science of Character.
(4) Spranger. Lebensformen.
(5) Binet. L'Etude experimentale de L'Intelligence.
(6) James. Pragmatism.
(7) Neitzsche. The Birth of Tragedy.
(8) Gross. Uber psychopathologische Minderwertigkeiten.
(9) Jung. Psychological Types.

(10) Kretschmer. Physique and Character.
(11) Rorschach. Psychodiagnostik.
(12) Oeser. British Journal of Psychology, XXII, pp. 220 and 287.
(13) Jaensch. Eidetic Imagery.
(14) Cattell. British Journal of Psychology, XXIII, p. 326.
(15) Saudek. The Psychology of Handwriting.
(16) Downey. The Will-Temperament and its Testing.
(17) Vernon. British Journal of Psychology, XX, p. 161.
(18) Watts. British Journal of Psychology, XI, p. 2.
(19) Moore and Gilliland. Journal of Applied Psychology, V, p. 97.
(20) Franz. Handbook for Mental Examination.
(21) Burt. The Subnormal Mind.
(22) Laird. Journal of Abnormal and Social Psychology, XX, p. 128.
(23) Terman. Journal of Educational Psychology, XII, p. 127.
(24) Knight. Intelligence and Intelligence Tests.
(25) Binet. L'Annee Psychologique. 1909.
(26) Cox. Mechanical Aptitude.
(27) Cox. Manual Skill.
(28) Seashore. The Psychology of Musical Talent.
(29) Trabue. Journal of Educational Psychology, VI, p. 1.
(30) Brigham. A Study of American Intelligence.
(31) Brown. Journal of Educational Research, V, p. 324.
(32) Berry. Journal of Educational Research, VI, p. 185.
(33) Pressey and Teter. Journal of Applied Psychology, III, p. 277.
(34) Pressey and Ralston. Journal of Applied Psychology, III, p. 366.
(35) Lawrence. British Journal of Psychology, Monograph, Supp., XVI.

Chapter IV.

ACTION.

In this chapter we are going to discuss overt behaviour. We have seen that " behaviour " includes such actions as walking, talking and shaking hands, and also thinking, perceiving and having emotions, but it is convenient to leave such " mental " or internal behaviour on one side for the moment and concentrate our attention on action as commonly understood.

At the outset we have to bear two points in mind : (1) The actions we are speaking about are to be understood as taking place in the " behavioural world."

(2) An action as ordinarily thought of, may be made up of a number of minute contractions, but we are thinking of it, as it were, in the large. Just as a house is made up of bricks but is, for all that, taken as a whole in itself, so an action is made up of atomic actions but is considered as a whole in itself.

What we want to know is : why do people act as they do ? and how do they learn to behave in the complicated ways which we observe ?

Now the first thing to recognise is that all acts take place on the general background of the whole person at the moment. There are, as we shall see, certain reactions which seem to be independent, in the sense that they appear to be called forth by a stimulus operating on a part of the body, and producing an effect with which the rest of the body and the personality in general seem to be unconcerned, but even in these isolated responses it is not true to say that they are absolutely independent of what is going on around them.

Let us analyse these general factors :

(1) *Constitutional factors.*—We are here distinguishing dispositional factors from momentary factors. A man will behave in such and such a way (i) because he has a certain constitution, and (ii) because he is in a certain state at the moment.

A. *Physiological.*—Under this head come primarily the nervous system with which he starts, and his glandular constitution.

Maturation.—The process of physical growth will produce changes in his physiological make-up. His nervous system will grow and alter, his muscular apparatus will change, his sensory apparatus will change, and important chemical happenings will take place, especially at the time of puberty. Of course these changes are to a large extent dependent on the environment : *e.g.* the amount and quality of food he gets, and the amount of sunlight to which he is exposed, but, granted that it will be modified by such circumstances, the power of growth, or maturation, is a factor which can be regarded as operating by itself.

Exercise.—The actual use of various parts of the body produce alterations in them. The obvious example of this is the growth of the muscles, and their atrophy when they are not used. The passage of an impulse over nerve junctions is said to alter the junctions in some way, so that impulses pass over that junction more easily next time. Exercise of the sense organs, too, may cause changes in them, or in the nerves which serve them.

Compensation.—Dr. Adler suggests that weakness of one part of an organism causes activity of a compensatory nature in other parts. This is certainly the case with the glandular system, which operates as a balance-seeking whole, but Adler goes farther than that. He says that if we have a weakness, *e.g.* in the lower part of the digestive tract, this may produce changes in the upper part which will send energy to cope with the deficiency and thereby weaken itself, and lay itself open to infection. If we have weak ears, we may " over-compensate " the weakness and become musicians ; he cites the case of Beethoven.

B. *Psycho-physiological.*—We have already seen in Chapter II that people vary in temperament and intelligence. This may eventually be reduced to purely physical make-up, but it is unsafe to assume such an explanation, and therefore we place such constitutional factors under a separate heading. The same may be said of the relative strengths of the instinctive urges.

Maturation.—There is a tendency towards unification of character and personality. This will be dealt with more fully in Chapter VI.

From the point of view of learning to behave towards the outside world, one of the most important factors of growth is the development of the power to fixate an objective and aim at it, and the development of the ability to co-ordinate our movements with our perceptions.

It has been found experimentally that our capacity to learn is a function of our age (1, p. 19), and Bird (2, p. 297) has shown that accuracy in pecking on the part of chicks depends on their age rather than on their having practised.

Experience.—As we go through life we accumulate " experience." We learn from what has happened to us and from what has happened to others, and pile up what we call our " knowledge " or " information."

We also learn by experience that certain behaviour is undesirable either because it brings pain or because it involves loss of love and protection, or because we believe that it leads to the one or to the other. Desires leading to such behaviour tend to become inhibited, and we may not be aware of their existence. It is also possible that we may inherit some inhibitions, *e.g.* the inhibition directed against incest.

Acquired interests.—Besides, and in connection with, his instinctive drives a man acquires certain interests (*a*) through the mere force of habit, and (*b*) as methods of satisfying his instincts.

A man's behaviour at any given moment is determined by all these factors. He has a certain physical constitution, modified by growth and internal changes ; he has a certain

temperamental orientation which has altered with experience; he has certain inhibitions and a certain amount of information, and he has filled out his general instincts with ideas about the ways in which he can satisfy them. But what a man will do depends also on his specific condition at the moment.

(2) *Specific background.*

A. *Physiological.*—In all responses we have to take the general condition of the body into consideration. If a man is drugged, satiated with food, suffering from toothache, in a fever, or very cold, these specific states will play a part in determining his reactions.

B. *Psycho-physiological.*—At any moment some desire may be dominant: *e.g.* the desire for food, the sexual instinct, the desire to please, and what happens will be influenced by such a state of tension.

If a person is hypnotised his responses will be different from what would be the case if he were not in that condition.

A situation may arouse some inhibited interest; a man may be exasperated because he is not receiving enough attention; something may happen to arouse his ill-temper; he may be in a "difficult" mood; all these states or "sets" of his personality will have a determining influence on the way he behaves.

Among the ways in which these specific total conditions may be set up we may enumerate the following:

(*a*) A state of hunger or sexual desire may be set up by chemical changes going on inside the body.

(*b*) A general condition of the body, *e.g.* illness, intoxication or neurasthenia may be brought about by a variety of physical factors.

(*c*) A change in the bodily functions may be brought about by psychological factors. This is the case in conversion hysteria in which, according to some psychologists, the physiological symptom is a symbolic representation of repressed desire or of the repressing forces (see p. 167).

(*d*) For the hypnotic trance, see page 200.

(*e*) A desireful orientation or a mood may be initiated from within:

(i) By physiological processes as in (*a*).

(ii) By a train of thought: *e.g.* in the course of a conversation you may have occasion to consider your engagements; as you think out what days you are free, you may stumble on a date which reminds you of an engagement which you want to avoid. At once you are absorbed in a calculation as to how you can get out of it, your conversation will flag, your answers will be random, your mood will alter and your friend may degenerate into a nuisance.

(iii) It sometimes happens that we wake up feeling anxious and despondent. According to Freud, this may be due to the fact that desires, inhibited in the wakeful state, have been allowed some expression and the restrictive apparatus has, as it were, caught them at play. The waking self smells the sulphur of the little hell beneath the surface when consciousness is aroused before the lid has been put back, and the reaction is a feeling of anxiety.

(iv) A set of ideas or a mood may perseverate after the occasion which has called them forth has passed away.

(v) A mood may suddenly come upon us, due to the arousal of unconscious interests.

(*f*) A desireful orientation or a mood may be initiated from without. This will depend on the total condition operative at the moment and the insistence of the external stimulus, just as the condition thus initiated will modify the response to succeeding stimuli. Examples are obvious: the smell of food will attract the hungry man and not the full, it may set him going to his dinner, or rouse him to violent action to obtain the food he smells; it may prompt the greedy to action when the chemical conditions are not those usually associated with hunger; it may lead merely to a train of thought. However the orientation displays itself, whatever the content of the desire may be, some series of happenings will have been set going by the smell of food, and the state set up will act as a determinant of behaviour so long as it lasts.

Two points must be made about those desireful orientations, or "directional sets":

(1) We must remember that in some sense we are responsible for the behavioural world. When we speak, for example, of a dangerous situation causing in us a state of terror, we do not mean a situation which is *de facto* dangerous, we mean a situation *apprehended as dangerous*. A man sitting under a cliff which is crumbling away may be in a dangerous situation *de facto*, but he need not be in a dangerous situation from the psychological point of view; conversely, a man may not be "really" in danger and yet he may apprehend the situation as dangerous. Of course it sometimes happens that the two coincide.

(2) We have spoken of the directional sets as though they were always explicit, as though, when a desireful orientation or tendency were aroused we were always aware of its direction. This is by no means always the case. We have already referred to unconscious and repressed tendencies and we must remember that besides these there are states of uneasiness and restlessness which come about without our knowing what to do to relieve them: *e.g.* we may find ourselves ill-tempered and *distrait* at 12 o'clock in the morning and recover after a good meal; we say, "I must have been hungry," but when we were in that condition we were not necessarily aware of its nature.

Having discussed the background upon which action is enacted we must now turn to action itself.

Reflexes.—The scheme of the reflex act has already been mentioned (p. 23). From the point of view of behaviour in the ordinary sense, we may put aside certain reflexes because they are more or less inaccessible to conscious control and because they do not involve action *towards* or *away from* an object.

The *knee jerk* is accessible to voluntary control, but is not a piece of behaviour "towards" the stimulus, it is simply a response to a stimulus.

The *pupillar reflex* is not normally under voluntary control, though Hudgins (3) reports that he educated a subject to obtain such control, and the response is not "aimed at" the light; what happens is that more light makes the iris

diaphragm contract and less light makes it expand, again we have a simple response to stimulus.

The digestive system, the respiratory system and the vascular system all work by means of interconnected reflexes ; they are all more or less inaccessible to conscious control, and the action is not " aimed at " (or away from) an object in the sense that a child's action in putting its hand out towards a candle flame is " aimed at " the objective.

In cases in which these simple reflexes are accessible to voluntary control there is often a difference in the time values when we compare the reflex as elicited by a suitable stimulus with the same action performed voluntarily. Peak (4) reports that in the case of the wink, as the time of closing decreases that of opening increases, when it is elicited as a reflex, while under voluntary initiation the relationship is changed.

Though these reflexes seem to involve segregated parts of the body, and though they can be called forth without our participation, their elicitation demands certain optimal conditions of the body. The pupillar reflex is modified by drugs, the knee jerk can be used to test the general " tone " of the nervous system, and the vegetative apparatus works as a whole so that if anything goes wrong with one part the rest will be liable to be affected.

Another point to remember is that although we, in the West, have not paid much attention to obtaining control of the respiratory, vascular and digestive systems, the Eastern Yogi practicants have devised certain methods whereby they have gained considerable control over these functions. We shall see that emotional states have reverberating organic concomitants, and it is not unnaturally claimed that control over these, *e.g.* the breath, will help to stabilise the organism.

The case of the *fixation reflexes* is somewhat different. Here we can control the movement of our eyes and heads, but there is a reflexive tendency for us to turn our heads or swivel our eyes in order to look straight at (fixate) an object seen out of the corner of the eye, and to turn our heads so as to face the direction from which the sound is coming. In such cases the light rays, or air waves, are acting on us, and

it may be, as Koffka suggests, that we fixate in response to a state of imbalance, so that when we do so we are merely restoring a balance which has been upset, but the result is that we orientate ourselves towards, or "aim at" an objective outside us, and these "concentration reflexes" are prerequisite to learning on any large scale.

Chain reflexes.—We have remarked that some animals are born with a disposition to carry out complicated *series* of acts. Such series are sometimes called "instincts" in order to stress the fact that they do not have to be learnt. Such are the building of nests, the paralysing of caterpillars and so forth. Spencer suggests that these series are of the nature of a chain of reflexes, such that any one reflex will cause the next one in accordance with prearranged nerve paths. When, however, we consider certain characteristics of these instinctive series, we shall see that this explanation is too simple. (1) They are more adapted to stimuli than are simple reflexes, so that if they are of the nature of simple reflexes the prearranged nerve paths must be very much more complicated than we have reason to suppose. (2) They are alterable, while simple reflexes cannot be profoundly modified to suit special circumstances. (3) They tend to persist with varied effort, and it is difficult to see how an organism can be fitted out to respond to all the obstacles which it will, in point of fact, attempt to overcome.

For such reasons the "Gestalt-school" abandon the doctrine of separate nerve paths, like wires for electric light, as the best conception of the way the nervous system operates in such cases, in favour of the conception of self-balancing systems such that a disturbance on the sensory side will lead to disturbances on the motor side, which tend towards the restoration of equilibrium, and which may take a variety of actual courses dependent on the sensory disturbance which called them forth, and the nature of the environment.

In any case such questions are not of primary interest to the student of human behaviour, because the human being is not made to perform any complicated series of actions at all; he has to learn.

What then are the principles of learning? The adult walks, and talks and plays bridge, the baby mules and pukes, responds to certain stimuli by fixating, stretching out its hand, grasping, sucking, turning up its toes, crying and smiling, but what concepts must we invent to help us understand how the latter is changed into the former?

Animals also learn. They not only adapt their responses to slight changes in the stimulus, they learn to make responses suitable to one stimulus in the presence of a quite different one, and they make quite unusual responses, which are not "natural" at all.

Conditioned reflexes.—As long ago as the eighteenth century (Siebold) it had been noticed that if a response A was the simple reflex response to a stimulus X, and if Y is often presented at the same time as X, then the response A can be elicited by Y in the absence of X. Investigation into the details of this phenomenon have been made by Pavlov, Bechterev and several American psychologists. The best-known experiments are those of Pavlov (5) on dogs: the salivary gland was cut so that the drops of saliva could be measured when they appeared at the sight of food, then a bell was sounded when the food was presented and after this was done several times the drops of saliva would appear when the bell was sounded and no food presented. This experiment is only a case of investigating in a laboratory what we observe in our everyday dealings with animals; the dog "learns" to come to the dining-room when the dinner-bell goes, and we will concentrate our attention on such cases, where the act is "natural" though the stimulus is "unnatural," and leave aside the cases where the act is "unnatural," such as the case of the swans at the Bishop's Palace at Wells, who ring for their own dinner.

The following points have to be noticed:

(1) The response is said to be "conditioned to" the associated stimulus.

(2) The conditioned response has to be continually supported by food. If the animal does not get food after several bell-ringings, it will cease to salivate.

(3) At first the response is made to several of a type of stimulus: *e.g.* to several sounds ranged round the original conditioning stimulus. Subsequently, if it does not get food after some sounds and does get it after one sound, the response is only made to that sound (specialisation of conditioned reflexes). By this method one can discover the creature's power of discrimination.

(4) The responses which are *not* made after such specilisation are often only inhibited and reappear under certain circumstances.

(5) When a conditioned reflex is implanted, it may serve as a basis for further conditioning.

(6) If an interval be left between the sounding of the bell and the presentation of the food, the salivation to the bell will occur after the same interval. This is true only within limits.

(7) Such conditioned reflexes are claimed to have been implanted in the lower organisms and in men. In the latter case, the stimulus is often one which primarily causes a withdrawal response (*e.g.* electric shock) or a fear response of a more general order (loud noises), and adults have been conditioned to remove their hands when there is no shock but only a bell sounding, while children have been taught a fear response to an animal from which they have withdrawn when a loud noise has been heard. In connection with the last case one should observe that pleasure responses can be inculcated as well as unpleasure responses. A child who is frightened of an animal might be conditioned to liking it if it is skilfully infiltrated into a situation in which the child is making pleasure responses, such as eating, but in view of what we shall say about the application of the theory of conditioned reflexes to human learning, we must remark that it is not suggested that the child eventually makes the movements of mastication at the sight of the animal when observed alone.

Now the "reflexologists" claim that the principle of the conditioned reflex is sufficient to account for all animal learning, and for learning in human beings as well. To

make their position stronger, they say that there is a special kind of reflex—a dominant reflex—which, when elicited, operates over a period of time, influencing and modifying the other reflexes which are called forth, inhibiting some and facilitating others. Such dominant reflexes are concentration reflexes, hunger-reflexes, sex reflexes, etc. If the organism is concentrated on a stimulus, or intent on getting food, stimuli which might elicit a reflex under other conditions will not do so.

In the case of human beings, though conditioned reflexes can be established, the rules which apply to animals have to be so modified that one is inclined to think that perhaps other factors play a part. In the case of the adult it is perfectly true that reactions over which he has no control, *e.g.* the pupillar reflex, can be conditioned to function at the sound of the bell, but in everyday life he has the impression that his "understanding" is a factor of some importance; this the reflexologists would deny.

The following points may be noticed:

(1) The conditioning does not have to be repeated so often in human beings when they "understand" what is going on.

(2) A conditioned stimulus is not always generalised. I may have been hurt by a dentist and therefore fear all members of that profession, but I may have been hurt by a doctor, when he has lanced a boil, and yet go to another without trembling if I want to be overhauled for the purposes of insurance.

(3) What we describe as an "awareness of the meaning" seems to play an important part in human reactions. If I have been conditioned to leap to my feet at the sound, "Dinner is ready," I may also leap to my feet if I hear "Madame est servie," or "Yer grub's ready," because I understand what is meant, even though I have never been conditioned to those words. Similarly, I may be conditioned to make a response to the sight of certain words on a piece of paper, but I may make the same response at the sight of the same words, written in different colours, on a different

material, although the stimuli I am receiving are entirely different.

(4) If we analyse my fear of dentists, we can see that the factors operative are by no means simple. I react with fear at the pain Mr. X causes, but I do not withdraw when I meet Mr. X in the street, nor do I object to taking my little sister to Mr. X's room, and I only fear Mr. X because I cognise him as a dentist likely to cause me pain. That is to say, my fear of dentists is not as simple as a dog's fear of whips, because it involves my understanding of the situation.

The upshot of this seems to be that with human beings something else, besides bare co-presentation of stimuli and mechanical linking of a response to a co-presented stimulus, is necessary for the understanding of human learning when it appears to follow the conditioned reflex plan. Fox (6, p. 38) suggests that even in animals the creature must link the two stimuli up in its "mind" by an act of attention.

For all that, the conception of conditioning is useful, because the principle of mechanical linkage of this kind does undoubtedly play some part in our education, more or less masked and modified by understanding and insight. When, as frequently happens, some item in the environment has a mysteriously disturbing effect on us, it may well be that we are "conditioned" to respond to it, *e.g.* with anxiety or fear, because of the co-presentation in the past of something like it with something terrifying; we may have completely forgotten the incident, and it is by no means obvious that we have to say that we did consciously associate the two together in the first instance. It is possible that under such circumstances the connection was made without our having to interpolate some actual connecting event in consciousness. What does *not* seem plausible is that *all* our learning conforms to such a plan.

There is a movement nowadays (*e.g.* Goldstein (7)) to discredit "reflexology." It is pointed out that the reflexes which are established in laboratories do not work in the

same way when the organism is behaving under " natural " conditions. We have already called attention in the earlier pages of this chapter to the importance of the background on which action takes place, and the background has to be very specially conditioned for the reflex to be elicited in a " pure " form. Even the knee jerk is influenced by variations in attention, and Bechterev himself remarks: " Experience shows that ordinary spinal reflexes are strengthened when concentration is distracted."

After all, the experience of everyday life teaches us that we cannot elicit the reflexes we read of in books from our pet animals, and we say that they, the animals, are interested in something else so that the reflexes are inhibited. In fact, as Goldstein points out, the hypothesis of " inhibition " really has to be brought in to save a theory when it fails to work. On these grounds he considers that the attempt to build up behaviour out of reflexes, primary or conditioned, is unsatisfactory. What, then, of the reflexes when they do work? This happens when the part of the organism involved is working in isolation, or in relative isolation, and that is why we have to have such special conditions for their examination. Pavlov had to see to it that the animals were completely isolated from all possibly disturbing stimulation when he was teaching a conditioned response. This means that a reflex is an abnormal response on the part of a temporarily dissociated area of the organism and cannot, therefore, be regarded as an element out of which behaviour under normal conditions is built. It is, in fact, a laboratory artefact, like " sensation."

According to this point of view a response under normal conditions is made by the total organism, and is a matter of the distribution of energy throughout the whole organismic field.

Let us now turn to the other kind of learning. Here we have an act, which is not a natural response to anything in particular, tied on, as it were, to a stimulus. According to Dr. McDougall the acts which a performing animal is taught are composed of responses which it is part of its

nature to make, ordered in an unusual way ; it is the unusual combination which is "unnatural." In point of fact it would seem as though manipulation on the part of the trainer were sometimes necessary : if elephants do not spontaneously sit, we can push them into a sitting position. In any case, whether the acts be spontaneous or not, we are training a creature to behave in an unusual way when a signal is given, or when it finds itself in a certain situation, and, moreover, a way which is not already linked up with a stimulus.

The method employed is the offer of reward, backed by fear of punishment, and it is found that fear of punishment is more effective with the lower organisms than the offer of reward. Now in these cases the reward comes after the act, and the order is : signal—act—reward, leading to signal—act. It is interesting to note that, though food is usually used as the reward (and for food to be a reward the animal must be appropriately hungry), trainers all agree that with the higher animals a friendly relationship must subsist between the animal and themselves, so that a gesture of friendliness may be sufficient compensation. Furthermore, no instance in which the animal does *not* perform the act on a given signal should be allowed.

Before we suggest the factors operative in such cases, we will mention experiments which have been performed on animals in which the creatures are left to themselves, situations in which the personal relationship between the animal and the human being is not so marked.

Day and Bentley (8) taught a paramecium not to bump itself against the end of a tube.

Yerkes and Huggins (9) taught a crawfish to choose one path in preference to another.

Wheeler and Perkins (2, p. 122) taught a goldfish to feed from the brightest of three lighted areas.

Maier (10, p. 451) taught rats to obtain food in an exceedingly complicated environment. The food was placed on a table, but wired off so that a rat on the table could not get it. There were three stands from the top of one of

which a pathway led to the food. A ladder was placed so that the rat could climb to the top of the stand. The rat was, in the first presentation, encouraged to climb the ladder to the top of the stand and so reach food down the pathway. "After the third trip the animal was removed from the situation for a certain length of time," then it was placed on the *table*, and had to get down on to the floor, climb the ladder to the right stand, run along the pathway and thus obtain the food. This introduces "delayed response" as well as understanding of the situation.

Delayed response.—It has been found that the maximum delay possible between the presentation and the testing varies with the type of experiment. Rats can respond after a delay of 7-24 hours, cats 3-16 hours, monkeys 15-20 hours, chimpanzees 48 hours (10, p. 449). Delayed response experiments vary according to whether the animal keeps its head turned in the direction of the stimulus to which it has to respond, and whether it requires previous training to perform the act which it has to perform. The figures mentioned above have been obtained under circumstances in which there was not continuous orientation of the animal to the stimulus-region, nor was there prior training except in the case of the rats.

Among the most celebrated of animal experiments are those of Thorndike, who put cats into puzzle boxes which could be opened by pulling a string or pushing a bar. In some cases the cats were able to liberate themselves when two tasks had to be performed: the first to liberate the obstruction and the second to open the box.

Trial and error.—The animal has a need, and therefore is prepared to do something about satisfying it. He makes random movements, some of them, from the observer's point of view, "wrong" ones, and eventually he does the "right" thing and places himself in a position to satisfy his need.

The problem has frequently been couched in the following terms: how is it that the "wrong" acts are eliminated and the "right" ones stamped in?

In answer to the problem stated in this way, the following principles have been suggested:

Law of frequency.—The right act is performed at least once every trial, the errors are not so frequently performed, and therefore the correct act is stamped in. This is not always the case. The animal may actually perform the wrong response more often than he performs the right one.

Law of recency.—The last movement to have been made is likely to be made again; the last act of the creature, when it gets the food, is the right act, and therefore it is likely to be impressed on it. Thorndike's cats, however, often took longer to get out of their box on a subsequent occasion than they did on the preceding one, before the trick had been established.

One of the most remarkable features of these experiments is the shape of the "learning curve," *i.e.* the graphic representation of the time taken to solve the puzzle, or make the correct choice, plotted against the number of practises. For a time the curve goes up and down—sometimes the animal takes longer and sometimes shorter times, or makes more or fewer mistakes—and then suddenly there is a sharp descent when the animal has "learnt." The same kind of curve has been made out for humans solving wire puzzles.

Law of effect.—The *success* of the right response establishes it at the expense of the wrong ones. This, as a mechanical process, is difficult to understand. How can the state of satisfaction act backwards and alter the nerve junctions which were in operation just before so that a nerve impulse is more likely to pass along them than along other possible junctions? And if it does, why does it stop at a certain point in its retroactive action; why should not the whole process be established retroactively?

A "congruence" theory is sometimes put forward to explain this mystery. If we call the animal's initial response to the situation "R(1)," and the further response, which has to be learnt, "R(2)," and the sensory stimulus which starts R(1) going, "S(1)," and the stimulus which starts "R(2)" going, "S(2)," then the rule is suggested that if R(2) is

"congruent" with R(1) it will become connected with R(1), and if it is not "congruent" it will not be connected with it. By "congruent" is meant, presumably, "in the same purposive direction as."

The reflex story is that somehow S(2) gets linked up with R(1) so that S(1) causes R(1) which puts the animal in such a position that it receives S(2) which causes the reflex response R(2). Thus S(1) gets associated with R(2) and when S(1) is presented there is an arousal of the R(2) response (11).

All these theories are unsatisfactory because they make the animal's response too fixed. The constituents of a course of action are not linked items which can be weeded out and thrown away, nor is the "act" which is subsequently performed always the same act from a physiological point of view.

Adams, in an instructive article on learning in the *British Journal of Psychology* (12), suggests that we ought to take up a different attitude altogether towards the problem. We ought, he thinks, to recognise that the animal, in a state of need, satisfies its need every time it solves the problem set, and if we compare its successive solutions of the same problem, we shall find that there is a rule of "economy upon repetition," which he suggests to be a fundamental property of organisms. True, the animal also has the property of retentivity, so that past solutions will influence present ones, but the factor which "weeds" out irrelevant actions, or rather, the uneconomical excrescences which have characterised previous solutions, is the tendency in every organism to take the shortest route to its goal.

Köhler (13) introduces another factor. He experimented with chimpanzees, and a typical experiment was the following. Outside the cage lay a banana which the chimpanzee could not reach, inside the cage and in sight of the animal lay a stick. After trying to reach the banana, the ape sat down and only displayed the presence in it of a "wanting-the-banana state of tension" by its glances. Suddenly it rose, seized the stick and scratched the fruit towards it. Here we have a trial and an error and a solution, but the solution comes suddenly. What has happened?

Insight.—According to Köhler the stick has entered functionally into the want-the-banana situation; it looks instrumental to the ape, and is no longer a mere stick. This occurrence is an act of *insight*, and Köhler tentatively connects it with the concept of intelligence. In human language the ape sees the meaning of the stick with respect to the solution of the problem, and Köhler suggests that the same kind of thing happens whenever an animal learns. It may try, err and succeed, but so long as the success is a matter of mere chance movements, the trick is not learnt; the learning comes about, no doubt, through the trials, but it involves something specific—an event of insight.

Such an explanation would be applied to the teaching of animals to perform tricks in a circus, and certainly, when we read of the way in which apes can be taught to use penny-in-the-slot machines we feel that something of the kind must take place.

If we look back on our discussion of learning, we shall see that there is a gulf dividing psychologists into those who believe that a motor response is tied on to a sensory disturbance without anything that could be called understanding coming in, and those who believe that understanding is involved. The first party contend that this linkage is established by bare co-presentation of stimuli (conditioned reflex) or by frequency of association, or by the retroactive effect of satisfaction, the other party believe that something extra happens in the organism which establishes the connection. It is important to remember that this "something extra" may be described in physiological terms, and that it is conceived in such terms by Köhler (13) and Adams (12). The course of action prompted by a situation involving a state of need "shakes down" by the principle of economy of effort into the shortest possible path, but it must not be thought of as being entirely independent of the behavioural world "in" which it occurs, so that the contents of that world are neutral with respect to it. The goal aimed at is seen as an attractive centre of force, and any means which enter into the course of action get a "look"

about them which alters the "configuration" of the field in which the animal is operating. For the "Gestalt" psychologists there is an intimate connection between perception and action: the stick, in the above experiment, acquires a "use me" look, so that for them "insight" is a re-organisation of the perceptual field, which is correlated with a patternising of processes going on in the physiological organism.

In practise we conceive of the act of insight in psychological terms; the important thing is that something more than mechanical connection seems necessary to explain learning; whether we think of it in terms of physiological configuration or in terms of psychological understanding.

This is a convenient place in which to introduce Lewin's notion of "Fields of Force" (14).

Lewin points out that we cannot consider action in an environment without taking the environment itself into consideration. He therefore conceives of the environment as being a system of forces, or "valences" which can be either attractive (positive vectors) or repelling (negative valences). Any movement on the part of the organism in this system is a function of the vector forces at work. Of course these themselves depend on the "nature" of the organism, and its condition at the moment, but granted a certain condition of need, and the apprehension of one objective as desirable, and another as having negative valence (either as an obstacle or as signal of pain), then the organism is pulled in the direction of the one and away from the other.

The result may be a roundabout movement which avoids the negative objective and reaches the attractive one, or—and this is an important notion—the organism may be driven "out of the field" altogether. This is a very useful device for depicting the function of pain and/or approval as influences determining action, and also for dealing with those cases in which a goal is abandoned because the organism has left the "field": "This withdrawal either may be physical, as when the child retreats, turns away, or

possibly leaves the room or place, or may be an *inward* going out of the field, as when the child begins to play or to occupy himself with something else " (14, p. 90).

The next problem is : what is the stimulus which elicits the response when it has been learnt ? Apart from cases (perhaps all situations involve this) in which we have to say that animals respond to situations " cognised as such and such," there are two possibilities which should be discriminated : (1) The creature may respond to a stimulus, standing out against a background, as in the instance of a dog which responds to a specific sound. But (2) the animal may respond to a stimulus in relation to other relevant stimuli ; it may be taught to respond to the brighter of two lights, or the larger of two patches. When this happens it is not the absolute value of the stimulus to which it responds, but the relative value. If you have a series ABC, in order of size or brightness, and if the animal be taught to respond to B when AB is presented, it may respond to C when BC is presented ; this is an important consideration for those who are interested in finding out what nervous processes are involved, and by exploiting this capacity it has been discovered that animals are influenced by the illusions of size, just as human beings are. If a curved piece of cardboard be placed under another piece which is " really " of the same size, and if hens have been taught to peck off the smaller of two patches, they will peck off the lower of the two curved pieces, because it " looks " smaller.

Now let us assume that connections have been established in a human being. He has started with a few inept movements, he has developed a fixation response and can " aim at " or " aim away from " objects, he has tried a variety of ways to get what he wants—crying, crawling, speaking or scrambling, and, whether with or without insight, complicated associations have been made between his sensory side and his motor side. The next thing that interests us is the persistence of such connections.

Habit.—The establishment of habits in human beings

has been experimentally investigated in a variety of ways. They have been taught verbal habits (learning series of nonsense syllables or learning poems by heart), type-writing and mirror-drawing, and several other habits which have the advantage of being measurable.

Learning period.—In addition to what has been said about learning in general, the following points should be noticed :

(1) In human " trial and error " the trials are always influenced by thought processes and are not entirely random.

(2) While repetition of an act certainly helps to establish a habit, it does something else as well. In the case of a muscular performance, the movements which make up the " act " get progressively welded into a smooth unity.

Sometimes this unity which is established is so unified that it is impossible to start in the middle, you have to go back to the beginning ; this is especially true of verbal habits.

(3) During the learning period there is often a region where there is no improvement ; this is represented in the learning curve by the " plateau." In some cases an interval, during which there is no practice, is " used " for consolidation : " We learn to skate in summer and to swim in winter."

(4) The learning of a habit is influenced by (*a*) conceptual guidance on the part of the learner ; (*b*) knowledge of results of each practice.

The learning of verbal material is discussed in Chapter XIX. on Memory.

Trace.—How are we to conceive of a habit when we are not displaying it ? We have already seen that there is a theory that some change has been made in the nervous system, such as the reduction of synaptic resistance. This theory has been given a terminology of its own by Semon. The trace is called an " engram " (15) and the excitation of the trace is called " ecphorising " it. When a trace is left by one practice, it is ecphorised at the next, and altered by every successive manifestation. Thus we accumulate the effect of every practice, and the past is there implicitly

in the present. Such a picture of changing engrams has its uses, but it only works for *habit* memory, and not for memory of events; we certainly are using the experience of past practice when we perform a habit, but we can, if we want to, refer to any given practice attempt, and if the individuality of the trace left by this event has been absorbed by the subsequent engrammatic alterations, we shall have to invent a separate series of individual traces to account for memory of events.

There is, however, an important consideration which makes the whole theory of brain traces far more complicated than is generally supposed. If we always performed the same act in exactly the same way, there would not be much difficulty in pretending that there are traces in the brain which are responsible for our behaviour, in spite of the fact that no one has ever seen them. The difficulty is, of course, that we do not learn a series of acts, we learn to do a certain "kind" of thing. When we have learnt the habit of type-writing, knitting, or whatever it may be, it is not a mechanical set of responses which has been impressed on us, but the ability to do a certain sort of thing, each performance of which is similar in certain respects to every other. The point is even clearer when we think of such general acquired abilities as language habits, or habitual attitudes of mind. The position is that we are able to do a great many things without having to control every step; sometimes the actual actions are very like one another from one performance to another, sometimes the performances only resemble one another in that the same *kind* of thing is being done. We then say that we have the capacity to do such and such, and try to find where the capacity lives. If we want a name for the "trace" in virtue of which we are able to manifest habitual activity, we can use the convenient word "schema," without committing ourselves to the view that any actual change in nervous fabric could be pointed to as representing it. It is certainly useful to have such a conception, because we want to think of habits when we are not using them, but it is essential that we should have a notion which is sufficiently

fluid for our purposes. We learn *skills* not acts, general capacities not isolated responses.

Recall situations.—Usually the situation which calls forth an habitual response seems so obvious that we are surprised to find a problem lurking here. We have seen that the stimuli need not be exactly the same, but there must be some similarity in the form or pattern of the situation. Occasionally, however, we find that an ingredient in the stimulus situation is more important than we thought. Many people cannot evoke a foreign-language "schema" unless they are in the country in which the language is spoken. Sometimes the recall-situation is narrowed down in a quite unusual way; a case is reported of a man suffering from aphasia, who could not blow his nose when asked to do so, but could when a nasal stimulus prompted him. Any case of forgetfulness, therefore, may be due, not to the disappearance of a "schema" but to the absence of the requisite ingredient for recall. This is an important point for educationalists; they must obviously inculcate material in such a way as to ensure the maximum variety of recall-situations.

Another recall element may be the passage of time. We tend to develop rhythmic habits, in the sense that a state will be evoked, not because of any external stimulus, but because it is "time" that such a state should be evoked. We tend to get hungry at certain times, and we try to educate our defæcatory apparatus to work "chronogeneously."

Force of habit.—If we regard a habit as being a string of reactions linked together, and linked to certain sensory happenings, the force of habit lies in the strength of the associations established between the items.

If we regard a habit as a collection of acts welded into a unity, we shall derive its cohesion from some special binding force which makes the whole into a whole; we shall then suppose that there is some special internal whole-relation which pervades the unity. This, regarded as a state of tension, is a useful conception, which helps us to deal with those familiar cases in which a habit when started and

interrupted betrays a tendency towards completion, and this is an important element in the dynamics of the "Gestalt" school.

If we regard a habit as a relatively self-directing method of satisfying our desires and bringing us pleasure, we place it in a kind of perspective, and think of it as exerting a preponderating influence over the satisfaction of desire, the force of the habit will be derived from the force of the desire, but we have to admit that, once established, they have a kind of autonomy of their own. We like doing things the same way and are irritated by change, and what may have started as a means to satisfy a desire may establish itself as an end in itself. This springs from a general tendency for any system to get out of the control of the central organisation.

Use of habit.—A moment's reflection will show us that, although we may develop "bad" habits, the capacity for learning how to do things relatively automatically frees us for other activities. If you are speaking your own language, you are able to think what you want to say, if you are speaking a foreign tongue which is difficult to pronounce, and which you know imperfectly, you spend so much time thinking where to put your tongue or your lips that you have no energy left to carry on a train of thought.

Directed behaviour.—Now if we want to contrast a piece of behaviour with habit, we think of a situation which we have to examine, analyse, and meet after a process of careful consideration. Here, we say, we make use of our "reason," and this is the function of reason so far as behaviour is concerned. The ends we seek are ultimately sought because we desire them, and this is not a matter of reason at all; it is the function of reason to enable us to satisfy our desires. It does this in three ways: (1) it analyses and characterises the situation in which we find ourselves, (2) it accumulates the data of our experience and the experience of others and from this it propounds general laws and makes pictures (hypotheses) of what the world must be like in which such general laws hold, (3) it argues from these

systems of beliefs what is likely to happen if we do so and so. The interpolation of this process between awareness of a situation and reaction to it is clearly of vast importance, and it is this that has enabled us to survive with the inadequate physical equipment with which we are endowed. For it to be of practical utility there has to be that peculiar nexus between the intention to move and the movement ; it is not enough to be able to experience movement, nor is it enough to have the idea of movement, if the specific connection between intention and action, which we refer to when we speak of control, is absent, neither of these is any use.

Of course some reasoning does not end in action at all, and with that we are not at present concerned, but where reason is applied to a practical situation it serves as substitute action ; we think out what would happen if we did this or that, and when, in the case of alternative possibilities, reason reveals the attractions and detractions of each, if the appeal is strong in both directions, the stage is set for conflict, and if we identify ourselves with one alternative rather than the other, then we have a volitional situation. We shall leave the examination of the will until later.

Actually, when we reflect on our behaviour, we can see that there is no clear-cut distinction between those actions which come under the heading of habit and those which are directively controlled. Behaviour is usually threaded through with both habit and conscious application. At one end of a scale might be placed the behaviour of the absent-minded man who goes upstairs to fetch a book and comes to himself to find himself undressed and in bed, while at the other end we might place a situation in which a novice is faced with a punctured tyre miles from a garage ; in the first instance, the body left to itself, goes through a routine, in the second the subject has to think out what to do in a novel plight in which he finds himself. Between the two are varying mixtures ; we set ourselves to knit and only direct our fingers when we come to a difficulty ; we set ourselves to write, consciously consider what we are going to say, and leave our fingers to wield the pen.

Of course, for the reflexologist, there is but little point in this *prima facie* distinction between habitual and controlled action. The processes of thought are merely the expression in consciousness of a nervous impulse taking an unusual, but predetermined path. The difference between habit and controlled action is merely a difference between impulses travelling along well-worn pathways and impulses travelling along new ones.

For the " Gestalt " psychologist, the insight into the situation involves a special patternisation of the nervous happenings, which, because of its *pattern*, will determine the course of thought, which will, again, be a patterned series, and this will determine the pattern of actions which will be performed. They think that the interpretation of the situation, and the process of thought about possible eventualities, play a rôle in determining what we shall do, and they conceive of both in terms of configurations or patterns.

Our discussion of behaviour is, however, incomplete :

(1) We have said that a habit may be performed in the service of a desire, but we must remember that the desire may be unconscious.

(2) We may do something which is not a mere reflex to stimulus, not an habitual act, and not consciously controlled ; in such cases we call in unconscious motives to account for our behaviour. We shall deal with such cases in Chapter VII.

(3) It sometimes happens that these pieces of unconsciously-motivated behaviour are very complicated, and instead of weaving themselves into our ordinary life, they occupy us entirely for a time, and we may be unaware of what we have done ; such is the case with hysterical fugue.

(4) We may be preoccupied with an idea that we shall do something, or not be able to do it, and it is held by some psychologists that this preoccupation itself, or the idea with which we are imaginatively occupied, has a determining effect, " tending to realise itself," as Baudouin expresses it. If the idea is put into our minds by some one outside, we speak of " hetero-suggestion," while if it arises in our own minds we speak of " auto-suggestion," and if it has

been put into our minds while we are in an hypnotic trance and has effect after we have been woken up, we speak of "post-hypnotic suggestion." This spilling over into action of a motor idea is sometimes called "ideo-motor action," and we shall meet with it again in Chapter IX.

(5) *Imitation.*—This, like a great many psychological terms, covers a number of different phenomena. We must distinguish between conscious imitation and automatic imitation. Conscious imitation does not present very much difficulty ; we see that some one does something in a certain way, we would like to do the same thing, and we analyse his movements and perform the same movements ourselves. It may be an individual movement or set of movements, or it may be a general scheme of action or style.

Involuntary imitation is far more difficult to understand. In such cases we mirror in ourselves a movement, a scheme of gestures, or a characterological pattern which is presented to us by some one else, without the interpolation of thought. This capacity to reflect what is going on in some one else is partly responsible for our knowledge of other people, and has been called " empathy " or " feeling into," although the notion of " empathy " is not restricted to our " feeling ourselves into " human beings. The imitation of isolated movements may reach the pitch of a clinical symptom called "echo-praxia," where the patient imitates every movement of the doctor while he is talking to him.

Some psychologists suggest that automatic imitation is of a reflex nature. This may be true in some cases : *e.g.* when we yawn in response to the yawning of another, but in the greater number of cases interest as well is involved. There may be an innate tendency to imitate, but mere perception is not by any means always sufficient to evoke it. If we are fond of some one, or impressed by them, or fascinated in what they are doing, we may imitate them spontaneously, but we have to be *involved* in the situation before the imitation comes about.

Psychologists of the psycho-analytic school are impressed by the selection of the persons whom we imitate, and the

high degree of generality which our imitation may reach. They claim that, on a basis of a love-relationship, some specific kind of reaction may be established to which they give the name of "identification," and they make this responsible for many of the phenomena of spontaneous imitation. This notion carries us farther than mere reflective mimicry of isolated acts ; when we have identified ourselves with some one we may express our identification by speaking in his tone of voice, or manifesting some characterological trait.

Such identifications do not seem confined to situations in which we can point to an emotional relationship ; we may identify ourselves with a character on the stage or in a book and mirror in ourselves his hopes and fears, and this may lead us to behave like them when we are not in the theatre or not reading the book. For this to happen it is possible that the person or character rouses some unconscious desire, and helps in some way to give body to a day-dream.

It is clear, too, that we imitate in virtue of our social natures.

(6) *Emotive expression.*—Mention must also be made of behaviour which is connected with, and indicative of, a state of emotion. We may relieve the state of tension by making random movements—pacing up and down or wringing our hands ; the significance of this will be seen in Chapter V. It is held that many expressions of emotion were at one time useful to our ancestors in a remote age, and that energy is running along antique atavistic pathways. When we should like to bite we gnash our teeth, in smiling we bare our teeth in preparation for the fray when we meet a stranger, and our tears are the vestages of the water our ancestors generated to wash away the sand in their eyes as they rode across the dusty steppes. It is probable that some of these explanations are correct, but it would seem that a great deal of emotional expression is merely the outward signs of the activity that is going on inside. It is interesting to observe that when the suitable grimace is consciously made, there is a slight tendency for the corresponding emotion to be felt. It has

been found that expression of emotion from person to person is not nearly as typical as might be expected, and not nearly as varied as the emotions he feels (16, p. 402).

Inhibition.—So far we have concentrated our attention on action, but a great deal of our education is concerned with learning what not to do. Just as pleasure helps us to establish a habit, so pain tends to inhibit behaviour which leads to it.

It is important to recognise what a large rôle is played by inhibition in our lives.

(1) If we identify ourselves with a character, we inhibit those responses that are incompatible with our identification.

(2) We not only tend to inhibit acts which have become signs of pain, but we inhibit acts which we fear (rightly or wrongly) will bring loss of love and protection in their train. A point here is too often forgotten, and that is that giving up doing something we want to do is in itself unpleasant. Our reaction to unpleasant obstacles is antagonism, and therefore, though we may give up our pleasure for love, we may lay the seeds of hate at the same time.

(3) Growth itself involves inhibition. As the structure of the personality develops, what was allowable at one stage may be incompatible with another. Sometimes it may happen that the tendencies may die away; very often, however, they persist, but under the ban of inhibition. When we look longingly back with part of ourselves on the joys of the past, our conscious personality may be suffused with feelings of disapproval or disgust which are the only indications we have of the inhibited, and out-of-date desires.

Recent research has shown how rash it is to assume that any tendency to action has completely disappeared. Conditioned reflexes in dogs reappear unexpectedly, and adult human beings sometimes revert to the behaviour of their childhood. Rivers built up an elaborate theory of the functional structure of the nervous system to deal with this point; he conceived of the nervous system as consisting of a hierarchy of controls, the upper and most recently

developed layers controlling the lower ones. This conception is useful for understanding some of the phenomena of intoxication; alcohol depresses nervous action, and the most recently developed co-ordinations—thought and moral restrictions—are attacked first, and freedom from control and criticism allows us to do things we should not otherwise do. We laugh, cry and caper until the insidious attack from above affects our motorium and our occular co-ordination and we stagger from the double lamp-post into the gutter.

Transfer of the effects of training.—Can we transfer learning in one field over to another? If the actions are very similar transfer is possible. Ewert (17) found that mirror drawing learnt with the right hand was transferred to the left. This was undoubtedly due to the fact that "central" factors, such as, in psychological speech, we should call "understanding" and "use of a method" were involved. Lashley (18) paralysed the left arm and hand of a Cebus monkey and taught it to open a box with the right hand; he then paralysed the right hand and the monkey was able to open the box with the left which had by this time recovered.

If the material is different, transfer is possible where actions in the new material are the same as, and play the same part in the whole as, the actions which have been learnt. If the actions are the same as the learnt actions, but play a different rôle in the new activity, there may be hindrance rather than help.

By far the most important element in the transfer of the effects of training, however, is not the actual acts which have been practised, as the development of a method of working, which is applicable to a variety of fields. The method of learning, is often far more important to the educationalist than the material learnt, because it has a wider spread. It has even been found that a discussion on methods of learning has improved the learning.

Reaction-time experiments.—Another way in which action has been experimentally investigated in psychological

laboratories is to make the subject perform some simple act, such as pressing a morse key down, as soon as he hears a shout, or sees a light.

It will be remembered that people differ in their attitude in such reaction-time experiments, some being concentrated on the stimulus and others on the response they have to make (*cf*. p. 57).

Play.—A heterogeneous collection of activities is subsumed under this heading, and for that reason it is not surprising that a number of theories of play have been put forward. The principal distinction between play and other activities is that play is relatively unserious in an important sense, but this does not mean that all instances of unserious behaviour spring from the same source :

(1) Recapitulation. Stanley Hall calls attention to the way in which some of the play of children reminds us of the habits of our remote ancestors.

(2) Preparation. Groos suggests that play is preparatory for " real " life : the kitten prepares itself for catching mice by chasing a feather, and the little girl playing with her doll is preparing for the tasks of motherhood.

(3) Surplus energy. Spencer says that we play in order to get rid of our surplus energy.

(4) Compensation. Lazarus, on the other hand, says that we play in order to recover in unserious occupations from the stress of real life.

(5) Symbolic expression. The psycho-analytic school explain a great deal of play as a method of satisfying in a symbolic form our repressed desires : moulding clay satisfies anal interests ; making things may be a way of restoring what, in fantasy, we have destroyed.

Each of these theories has something to be said in favour of it, and none of them are entirely satisfactory.

When we come to the field of organised games it is quite clear that no single motovating factor will account for the whole complex of activity. Aggression may be drained off in games of violence, our desire to be better than our fellows induces us to pit ourselves against them, a game takes our

minds off serious matters, participation in the co-ordinated behaviour of a team may satisfy our gregarious natures, and so forth.

Stern (19, p. 484) protests against the tendency to find purely biological reasons for play. Play, he says, may be useful, but it is more than that; it is one of the most characteristic features of mankind that he can and must be unserious. Schiller once remarked: "Man is wholly man only when he plays," and although this may be regarded as an exaggeration, there is much to be said for it. Mankind has risen above the severe pressure of sheer existence, and can afford the luxury of reorganising the world to suit his whim. He is so far free from the rules set by his environment that he can invent rules for his own amusement.

Play and therapeutics.—On account of the value of play as a form of symbolic satisfaction, Dr. Melanie Klein (20) has developed a technique of psycho-analysing young children in which play is used as an indicator of impulses which cannot be revealed by "free association." In the play, impulses which are responsible for psychological disturbances, betray themselves, sometimes with startling clarity.

Speech.—A particularly important form of behaviour is "speaking behaviour." We are apt to regard speech as consisting of a set of conventional symbols kept in dictionaries, and impressed on a child as it grows up just as sounds are impressed on the disk of a gramophone record. This "logical" way of looking at the matter misses the most important point, which is that speaking is a mode of behaving, and is primarily learnt for instrumental rather than referential purposes.

Lewis (21) has made a careful study of infant speech in which he has analysed the part played by the child's own interests and emotions and the part played by his adult environment. In the early stages the child's utterances are expressive: nasalisation on the whole indicating discomfort, and "p," "b," "d," "t" indicating comfort. By sound-groups made up of these consonants, and also by means of

vowel sounds the child evinces his affects. He also "babbles" because of the pleasure he gets in repetition. The adults round him are making noises at him, and there is a connection between the child's tendency to utter and the sounds he hears, based on his interest in the human voice and his "tendency to respond by speech to speech" (21, p. 98).

The important point, however, is that the child develops his vocabulary in situations which are charged with affect and striving: he wants to express, he wants to call attention, and he wants to get; similarly the adults' noises mean facilitation or inhibition of his desires, and when the child, towards the end of the first year of his life, begins to take a more active interest in his surroundings, he will *use* speech for practical purposes. Gradually his words will acquire more and more objective reference, but there will always be a "use-value" operative in the enlargement of his vocal equipment. In the early stages, sounds, heard and made, will be integrated with the total situations in which they occur, and gradually get isolated; in the later stages, speech itself will be important as an instrument in its own right.

We must also remember that the adults, themselves, will confirm the learner's acquisitions by repeating them in appropriate circumstances, and responding to them by appropriate behaviour.

Laughter.—Finally we must mention that most curious response of man, the rapid expulsion of gusts of air sometimes accompanied by widespread agitation, which we call "laughter."

Numerous attempts have been made to discover some single characteristic which is to be found in all situations which evoke laughter, and it is impossible to do justice to the ingenuity of the writers who have tried to throw light on this obscure topic.

There are, roughly, two types of theory: (1) descriptive, and (2) dynamic.

(1) Can we classify the situations which make us laugh under one heading? (*a*) It is suggested that we laugh at

other people's misfortunes, and that our laughter is " a sudden glory arising from a sudden conception of some eminency in ourselves " (Hobbes). It is true that some laughter is malicious, but not all, and not all instances of misfortune provoke laughter.

(*b*) There is always present some incongruity, some deviation from an ideal. For Meredith (22), the Spirit of Comedy laughed at " violations of unwritten but perceptible laws," Michiels (23) sees in the comic all that is contrary to the ideal of human perfection, while Bergson, with his ideal of plastic vitalism, sees in the comic " something mechanical encrusted on the living " (24, p. 37). Again, not all incongruity makes us laugh, and we laugh when no incongruity is present.

(*c*) Laughter is a form of play (Sully and Eastman). This only raises the question : what is play ? and gives rise to the reflection that there is more in play than laughter.

(2) Is there anything which is always going on inside us when we laugh ? (*a*) Freud (25) suggests that : " The pleasure of wit originates from an economy of expenditure in inhibition, of the comic from an economy of expenditure in thought, and of humour from an economy in feeling.

(*b*) Greig (26) relates laughter to the smile, a response associated in infancy with feeding and erotic pleasure. The smile and the laugh are directed towards loved objects, so that " the laugh is a response within the uncertain and ill-coordinated behaviour of the instinct of love. It appears to arise within such behaviour when an obstruction of some kind is first encountered, and then, no matter how, suddenly overcome ; it marks the escape of psycho-physical energy mobilised to meet the situation, but not actually required for that purpose, and therefore for the moment surplus." The kind of obstacle may vary ; it may be our own inhibitions, or a sudden and unexpected variation in a train of thought which has already aroused the love instinct, or it may be both. Our malicious laughter at our enemies is due to the ambivalent nature of our relation to them, and Greig calls our attention to the fact that if we wholeheartedly hate or if

we are indifferent, the laughter at the misfortunes of others is not so easily aroused.

Besides these "primary" causes of laughter, we must notice "secondary" prolongations due to suggestion, politeness, showing-off, and the desire to ingratiate.

Summary.—The child grows into the adult by developing the capacity to co-ordinate its movements and fixate its objectives; then, either by insight or in some other way he connects certain actions with certain stimulations, and certain actions with the achievement of certain ends. His behaviour is not made up of mere collections of acts, the acts are welded into units of behaviour which have a beginning and an end. Sometimes he controls his action consciously at every point, but he also acquires general capacities to do a great many kinds of things with lesser degrees of conscious control. His understanding seems to be important for the apprehension of the nature of the situations he is placed in, and the point of the actions he performs. Besides this learning by doing, he also learns by watching and imitating the behaviour of others.

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(22) Meredith. An Essay on Comedy.
(23) Michaels. Le Monde du Comique et du Rire.
(24) Bergson. Laughter.
(25) Freud. Wit and its Relation to the Unconscious.
(26) Greig. The Psychology of Laughter and Comedy.

CHAPTER V.

AFFECTS, EMOTIONS AND FEELINGS.

THE subject which we are about to discuss are among the most familiar in experience and the most obscure in theory with which psychology deals. In the first place there are a great many words which name the experiences with which we shall be concerned, and poets and novelists are at pains to invent expressions which will either convey such experiences to our minds, but in the second place, when we come to theory, we are immediately faced with a variety of usage of the same terminology which, to the student, may well seem little short of scandalous.

We understand what is meant by thought, perception and imagery, though we shall find that there is no happy agreement among psychologists as to what is going on when we think, perceive or image, but such words as "affect," "emotion" and "feeling" are not used with any marked consistency.

The position is that when we reflect on human experience we see that besides perception, imagery and thought, something has to be added to the catalogue. We do not stand aloof and contemplate our perceptions and our images, and we do not merely apprehend our trains of thought, we are *moved*—we are *involved*. Something has to be added to the list of things we "have" before our minds.

Of course we may be mistaken in supposing that something *sui generis* has to be added, but certainly the categories of bare apprehension are not enough, they leave out that which provides the warmth and vigour of experience itself.

What has been left out? "Feeling and Emotion,"

might be the reply, but is there any difference between these two notions ? The experiences themselves are difficult to classify, the language of common sense is imprecise, and sometimes a psychologist follows one common-sense usage and another psychologist, writing about the same subject, follows another. This means that we must try to get back to experience itself if we want to find out what the problems are. It is here that a cardinal principle of procedure is of the utmost importance for the beginner in psychology. It is fatal for him if he starts by supposing that the psychologists are agreed on the use of the word " feeling," then proceed to look round for feelings, because he will soon begin to complain that Mr. X calls pleasure a " feeling " while Mr. Y says that it is an affect. The point of importance is that they are both talking about pleasure, and if the student has reason to believe that Mr. X and Mr. Y have anything of importance to say on that subject, he has to learn the language of each. The same principle applies to the use of such words as " instinct," " memory " and a host of others.

For ourselves, we shall require some kind of classification of the material with which we are dealing, and shall adopt the following order : A. Pleasure—unpleasure (variously called : feelings, hedonic tome, affects, affective tone). B. Large-scale " emotions," " mixed emotions " and " secondary emotions." C. Intellectual " emotions " or " feelings." With respect to each group we shall ask the following questions : (1) What is the experience like ? (2) What is happening when we have the experience ? (3) On what occasions do we have the experience ? There will also be questions special to each group.

A. Pleasure—Unpleasure.

(1) What is the experience like ? There is a notable catch here. We have to use the word " unpleasure " instead of the more familiar " pain " because there is a specific kind of sensation to which the word " pain " is applied.

Such sensations are nearly always unpleasant, but there are people who seek pain because it gives them pleasure. Here analysis is difficult and therefore reports are not altogether trustworthy. It seems paradoxical to suppose that the pleasure is felt as attaching to the pain in the same kind of way that it can attach to the sweetness in a gustatory experience, though this is not out of the question. There seems good reason to believe that when pain is sought it is fundamentally because it means punishment, and, as we shall see, some people have unconscious wishes to be punished. The pleasure, therefore, would be a qualification of the total state of consciousness in virtue of the satisfaction of a tendency.

Pleasure and unpleasure are not separate items in experience like images and sense data, but rather adjectives of it. We " pleasantly taste " an orange and " unpleasantly listen " to the hostile critic. This point is being made when psychologists use such expressions as " hedonic tome " or " affective tone " when they wish to refer to the pleasantness or unpleasantness of an experience.

Pleasure and unpleasure are not localised and cannot be imaged. When we picture a pleasant experience, we may know that it was pleasant, but the pleasure is not before us in the same kind of way that the experience may be before us in imagination, though we may have pleasure (or unpleasure) in the actual imagining.

Wundt calls attention to other qualifications of experience besides pleasantness and unpleasantness, but closely allied to them. He presents a three-dimensional scheme of " feelings " (*Gefühle*) pictured as three lines crossing at a neutral point. Along one axis you have pleasure-unpleasure, along another exciting-restful and along the third tension-relaxation.

The value of this lies in the reminder which it gives that the texture of experience is, as it were, shot through with qualifications of this kind, and that when we pick out pleasure and unpleasure for special treatment we are abstracting only one quality from a number of others.

(2) What is happening when we experience pleasure and unpleasure ? Psychological : It has been said that pleasure *really* is a sensation. This might mean that when we pleasantly sucked our orange we had before our minds the taste of the orange and a sensation added which we mistakenly call " hedonic tome," or it might mean that pleasure, as we experience it, is a sensation like blueness or hardness. Neither view is very plausible. In the first place we actually do " have " pleasure before our minds and it is difficult to see how we can be mistaken about a sensation and believe it to be something else, and in the second place pleasure and unpleasure seem to fall obviously into a different category from sensations altogether ; as experiences they cannot be classified among them.

Physiological : Pleasure and unpleasure have been correlated with variations in pulse-rate (increase for pleasure and decrease for unpleasure) and rate of breathing (faster for pleasure and slower for unpleasure).

(3) Under what circumstances do we experience pleasure and unpleasure ?

Biological view.—It has been held that pleasure is a bribe to make us do what we ought to do for the biological purposes of survival and reproduction, while unpleasure is a danger signal. There is clearly something to be said for this theory, but equally clear that it is not the whole story. Many poisons taste delicious and many unpleasant liquids are good for us. The one situation in which the view is illuminating is that of sexual intercourse. It is argued that the pleasure of the sexual act is sought in ignorance of what it will lead to, and even in defiance of such knowledge, so that male and female are lured by the pursuit of pleasure to reproduce their kind. Even if we postulate a special urge to seek sexual intercourse, it is clear that the pleasure accompanying it plays a part in tempting us to repeat the experience, and that it is often the pleasure that we seek rather than the effects of the performance, which we may attempt to prevent altogether.

Adequate-functioning theory.—According to this view

pleasure and unpleasure are the signs of efficient and inefficient functioning respectively. When a tendency has been aroused and its manifestation is unimpeded, pleasure is liable to colour experience, and when actual activity goes well we experience pleasure. There may be some fact of physiological efficiency in certain movements, which is responsible for the pleasure we experience in making such movements, irrespective of the successful attainment of an end by means of them (Bühler's *Funktionslust*). Whether we can point to a similar fact of physiological efficiency (*e.g.* in terms of energy distribution), which will account for sensation-pleasure is another matter. We must beware of assuming such a state of affairs in order to make our theory account for all pleasure. It is held that some colours are pleasant because they are restful, and that æsthetic pleasure can be accounted for by supposing that some state of balance is induced in the organism by the stimuli received from the work of art operating on a certain condition of the body.

It still remains possible that some sensations are pleasant in their own right, and that we cannot fit their pleasantness into any other scheme.

Energy-economics theory.—Freud suggests that pleasure and unpleasure can be conveniently pictured in terms of the amount of disponable energy in the organism ; there is an optimal rate at which the energy of the organism is spent and the general principle is that pressure of energy is unpleasant and reduction of pressure pleasant.

B. Emotions.

Under this heading we have to treat of such different experiences as rage, fear, awe, hope, despair, and by way of getting our material into some kind of order we will follow McDougall's classification : (*a*) Primary emotions, *e.g.* rage, fear, lust ; (*b*) compound or blended emotions, *e.g.* awe ; (*c*) derived emotions whose existence depends on a tendency having been aroused, and which, as it were,

indicate its progress, *e.g.* hope, despair. McDougall (1, p. 156) now prefers to call these "complex feelings" and he includes under this heading the "retrospective complex feeling" of regret.

(1) What can be said by way of describing the experience? Just as it is impossible to describe pleasure and unpleasure, so it is impossible to describe fear or rage, they are ultimate experiences, and if the words convey nothing, discussion must cease, but there are certain points to notice.

Usually an emotion is felt towards something more or less well-defined. We are angry with the man who has run into our car, we are frightened at the sight of the gunman, or fearful of what may spring out upon us from the dark. Sometimes, however, we feel vaguely anxious without attaching our anxiety to anything in particular. This may have a physical cause (*e.g.* angina pectoris), but some psychologists hold that the anxiety may have an object but that what we are anxious about cannot come into consciousness because of repressions. Those emotional states, too, which are frequently spoken of as appetites, can be established without our having an objective before us, but when they are there as, *e.g.* in the case of hunger and lust, we may look about for a certain class of objects which will satisfy the desires of which the emotions are an expression.

We must beware, too, of being too sure that we are right when we give an account of the cause of an emotion. We may be afraid of X because X stands for, or reminds us of Y, and we may be quite ignorant of the fact, and proceed to find something which justifies our fear of X. Again, we may be angry with A, not only because he has thwarted us, but because we are, for other causes, feeling irritable. In fact, the arousal of emotions in the presence of and directed towards, unusual objects, or the absence of emotion in the face of a situation which usually gives rise to one, are invaluable indications of unconscious tendencies.

The most important feature of the major primary emotions, such as fear, rage, lust, is that bodily accompaniments are prominent, so prominent, indeed, that it is undoubtedly

from them that these emotions get their bulk. Constrictions of the chest, tingling at the roots of the hair, cold sweat upon the brow, and a variety of stomachic disturbances seem to make up emotional states, and William James asked what an emotion would be if they were absent. Surely, he suggested, the emotion would cease to be altogether. Taken strictly this would mean that we could not tell the difference between a set of organic sensations and an emotion. This is, of course, untrue. It might conceivably be the case that when we have an emotion there is a considerable amount of physiological disturbance, and that if this physiological disturbance were not to take place we should not have an emotion, but this does not mean that an emotion is the same as a set of organic sensations, it simply means that some physiological disturbances cause organic sensations and others emotions. In actual fact it seems truer to say that organic sensations, which we do certainly have when we have emotions, are closely associated with, but exist by the side of the emotion itself as introspectively discriminated. It is exceedingly difficult to keep apart what an emotion feels like, and what psychological theory believes to be going on when we have one.

A further descriptive point concerns the varying degrees of integration of emotions with the rest of the personality. The major emotions we have so far mentioned are relatively isolated or departmental. The whole personality may be involved in a sense, but it is entirely occupied with the emotive situation and that side of its nature which is being called forth is in almost complete control: we are all fear or all hunger. When we mention the derived emotions of joy, sorrow and happiness we seem to be referring to emotional conditions which suffuse the whole organism in all its functions. Something seems to be happening to a more complexly integrated whole when we say that we are happy, than is the case when we say that we are having pleasure.

(2) What is "really" going on when we have an emotion?

(*a*) Even though introspectively an emotion is not a group of sensations, it is possible that it is an emergent

characteristic of sensations arranged in a certain way. Such seems to be the view of Krüger, who holds that an emotion is a quality of a total state of consciousness in virtue of its totality-pattern.

(*b*) Cannon (2) discovered that when animals were placed in situations in which they were calculated to have the emotions of hunger, rage or fear, certain physiological changes took place, notably in connection with their ductless glands. It is naturally thought that such changes are the causes of the emotions. The difficulty is that there does not seem to be a variety of physiological condition corresponding to the variety of emotions experienced.

(*c*) *Psycho-galvanic reflex.*—It has been found that when a current of electricity is passed through a person and also through a galvanometer, and when, further, an emotional condition is induced, a change occurs in the flow of the current. From this, again, we cannot tell what emotion is being experienced, and the introspective data does not always agree with the galvanometric readings. The stimuli used are sudden noises, pricks, lists of words, and descriptions of dreams, and it is suggested that we have here a method of detecting emotion which is out of the subject's control, which would render the galvanometer a useful adjunct to psychological, and even criminological enquiry.

A distinction is made between the investigation of these electrical alterations, according to whether they are investigated by passing a current through the body (psycho-galvanic method) or using the body itself as a battery (Tarchanoff's method).

Such are a few of the opinions of psychologists. They do not carry us far. It is clear that when we have one of the major emotions in which introspectively we experience organic sensations there are physiological disturbances going on, but whether there are somatic processes specific to each emotion we cannot say.

(3) Under what circumstances do we have an emotion ?

(*a*) *James-Lange theory.*—According to James and Lange the stimuli from the environment act on the organism and

directly cause somatic changes which *are* the emotion. Such a view disregards the cognition of the characteristics of the situation as being of importance. If we see a bear the stimuli from the bear will cause in our bodies certain changes and these are our fear. James Ward (3, p. 271) disputes this with a happy phrase : " Let James," he says, " be confronted first by a caged bear and next by a bear at large : to the one object he presents a bun, and to the other a clean pair of heels." Even if an emotion be an emergent quality, or if it be a psychological element correlated with certain bodily changes, the normal occasion for its arousal does seem to be the perception of something as such and such, though we have seen that under certain abnormal conditions, physiological states may be immediately responsible for emotional experiences.

James also teases us by saying that we are sorry because we are crying, and frightened because we are running away. The " because " is the source of the paradox. What he means is that we sorrowfully weep, or frightenedly flee, because the emotion *is* the sensations we have when we cry—it does not come *after* the crying. The real paradox lies in the suggestion that the emotion is the same as the crying, and the fear the same as the fleeing.

(*b*) The circumstances under which people have emotions vary not only with respect to the situations but also with respect to the persons. Some people are more easily " touched off " than others. For this distinction the word *temper* is used.

(*c*) Another way of looking at the question : " under what conditions do we have emotions ? " is to ask how the having of emotions can be fitted in to a scheme along with other forms of behaviour.

The most important view is that emotions are signs of inadequate response. This view does not satisfactorily deal with all the phenomena which come under the heading of " emotion," but it is helpful in disposing of some of them.

To begin with we have mentioned that certain physiological changes have been found to take place when an animal

is placed in a situation where it might be calculated to have an emotion of fear. These changes can conveniently be interpreted by saying that the decks are being cleared for action. The heart is speeded up, sugar is rushed to the muscles to be burnt as fuel, digestion is stopped so that all energy shall be concentrated on meeting the situation, and frequently the bowels and bladder are emptied. In fact, one may say that what is going on is a preparation for activity.

Now it has been noticed by many psychologists that the major emotions are associated with instinctive urges, or whatever expression they use when they wish to refer to the dynamics of behaviour ; fear and self-preservation, anger and desire for unimpeded action or, according to some, the " instinct of pugnacity " seem to go together. McDougall, indeed, has given us a list of instincts and the appropriate emotion alongside each.

What, then, is the part played by emotion ? Two points have to be noticed : in the first place if an emotion is very intense action is less adequate. If you lose your temper you will run the risk of not fighting as scientifically as you would if you were " cooler," and if you are in a panic you may not even be able to run away. In the second place, emotion seems of a great many occasions to increase with inactivity. If you are waiting for a tram you may get irritated, and you may find that your irritation is slightly diminished if you walk on to the next stopping-place. This means that you are draining off some of the energy which is accumulating because you cannot make an adequate response to the situation. In a situation cognised as dangerous you seek methods of protecting yourself—it may mean running for your life, running for help, running for cover, or staying hid—and the more adequate you believe your response to be the less fear you are likely to experience. The fear is, as it were, a measure of the *apparent* adequacy of your response : *real* adequacy is neither here nor there. The emotion, too, has nothing to do with the activity or inactivity of the response—you may

feel your fear lessened by taking to your heels or by hiding under the bed.

In connection with the last-named response we may remark that the actual presence of the danger is a constant irritant, and one may find that what seemed at first an adequate hiding-place loses its adequacy as the enemy draws on. And even when immobility is called for it is notoriously difficult to keep completely still. This point about the importance of the actual presence of the emotion-provoking object has been noted in another connection by the Chinese philosopher Mencius, who, when he saw a king moved by the terror of an ox to order that a sheep should be sacrificed instead, remarked that it was because he had actually seen the ox and not the sheep.

We can now attempt to link up the discoveries of Cannon with this " inadequate-response " theory. When the organism is in a situation cognised as one calling for action, physiological preparation is made, and the vegetative system is relevantly altered. If action does not follow the appropriate course, the energy is dammed up and random movements will occur, innervations of an atavistic type will take place (emotional expression) and eventually the disturbance may grow in seriousness and the organism rendered incapable of any adequate action whatever. It is possible along these lines that elaborate funereal technique is a method of dealing with a condition of pent-up agitation for which there is no obvious outlet.

The great emotions of fear, anger and lust all fit into this picture, and we can find a place for the reflexion of Claparède (4, p. 126) to the effect that although fear renders the organism less capable of responding to the situation, a condition of excitement is of value. The organism must " mind " about the situation if it is going to take any steps, so that we should expect a certain amount of emotion to be advantageous, corresponding to the physiological preparations, but too much to be disadvantageous because the organism has been prepared in vain.

All the emotions, however, do not fit in to the scheme so

conveniently. The tender emotion of love, which is introspectively different from lust, does not have this inverse relationship to the activities which the tendency with which it is associated gives rise. Here the emotion is one which increases rather than diminishes with action.

The "derived emotions," too, have a somewhat different relationship to the tendencies with which they are associated. They are, as we have mentioned already, like comments on the process which is in possession of the organism, and not attached to any specific one of them.

If, with Claparède (4, p. 133) we think of the "whole affective phenomena" as "subjectively the consciousness of an attitude and objectively the attitude itself," we can bring into line a great many of the views to which we have referred. The attitude is one which we take up after perceiving a situation as such and such, or because the organism is shaken by the stimuli which give rise to the perception itself; it involves the whole of the organism and Krüger's notion of emotion as a "complex-quality," in the sense that it is a quality which characterises complexes, fits in here, while the alteration in the emotional state brought about by action becomes intelligible. Furthermore we cannot be surprised at the enormous range of affective experience to which the enormous variety of our attitudes gives rise.

There is, however, a simple theme which runs through all this variety, and that is the bi-polarity of attraction and repulsion. This comes to the fore in Stern's (5) treatment of the subject. In his theory the relations between the inner and outer experiences of the "Person" are represented on a scale of "embeddedness" and "standing-out-ness." The organism has developed certain interests, attitudes and skills which it has made its own and which are embedded in it, and external stimuli will set up a condition of agitation which will either tend to remove the stimuli or preserve them or increase their proximity, and thus there will be degrees of "standing-out-ness" of affectivity according to the unpreparedness of the "Person" to cope with the

situation. Since the " Person " has a multitude of interests, and can be shaken in various degrees, there will be indefinite variety in the quality of the emotions and in their " depth." What tends to satisfy and further the tendencies which are set up will be preserved and approached, what tends to thwart those tendencies will be removed or fled. Emotion is by no means something which should, ideally, be done away with ; it is only a sign of mal-adaptation when it stands out as a symptom that the " Person " cannot come to terms with the situation in which it is placed ; it may, however, stand out as a sign that the " Person " is intensely interested in furthering ends which it has at heart.

Control of emotion.—Physiologists tell us that when quantities of adrenaline are poured into the blood the glandular balance is likely to be upset, and the organism as a whole harmed. This means that anger and fear are bad for us physiologically. Socially also they are condemned for obvious reasons. Lust is socially condemned in certain culture-patterns and grief, while socially praised if it keeps itself within bounds, is ambiguously regarded by the individual—he does not want to be hard-hearted, he does not want to grieve, and yet he does not like grieving. There is therefore a widespread feeling against these emotions, and mankind has always been seeking to control them. In the West, particularly in England, the forces of social pressure is used : good form forbids emotional display, while in the East the practice of mental exercises has been partially directed towards the end of " freeing " the individual from the plague of emotional upsets. How, then, can we influence our emotions ?

(1) We can pit against one state of tension another state of tension whose force is stronger, and whose expression is incompatible with the expression of the first. Social pressure is of this kind. We may be terrified, but we do not run away because we do not want to be thought cowards. This does not reduce the emotion unless the emotion associated with the competing tendency (pride in being thought well-of) is very strong. Furthermore, it has been

discovered that the repressing of a tendency in this way may have harmful effects.

(2) Intellectualisation. We can try to diminish our emotions by inducing a habit of "intellectualising" situations, that is to say, regarding situations from a "scientific" point of view. This would be expressed by some psychologists by saying that we pit our instinct of curiosity against other instincts. We try to school ourselves to be more interested in the situation than moved by it. It has frequently been alleged that if we understand we cease to be angry, and it is true that psychological and anthropological interests often carry us through situations that would otherwise be painfully, emotionally toned. Whether such an interest would prevent our being frightened is dubious, and we must confess that on those occasions on which we forgive because we understand, there is reason to suppose that the emotion has already abated somewhat before our understanding has got under weigh.

(3) Psycho-analytic theory has made us familiar with the notion that many of our emotional-tensions are concerned with unconscious and fantastic objectives; we fear unreal punishments for unreal reasons meted out to us by fantastically cruel and hateful persons. If we could get to see that we are angry with, or terrified of, a fantasy, we should then cease being angry and terrified on such occasions. This would reduce our emotions to a very great extent simply by removing their "real" cause.

(4) There are, however, one or two other ways in which emotions can be influenced. Attention may be distracted, and, as we have seen action may be used to reduce the tension (6). For an unusual method, but one which should not cause us any surprise, we turn again to the East. We may attempt to get control over those parts of the vegetative system which are normally to a greater or lesser extent beyond our normal control, thereby modifying the organic effects of disturbing situations. If danger makes our hearts beat faster, and if we can get control of the beating of our hearts, we may be able to do something to stem the

forces which lead to panic. Such a dream may sound absurd to western ears, but such is one of the aims of breath control, and other exercises which are practised by people who believe that if they attain a sufficient state of detachment they will free themselves from the bondage of earthly existence, and there is good reason to believe that the result of these practices does modify the emotionality which is a sign of attachment to worldly things. It is clear that there is much to be learnt from eastern psychologists on this subject, and it is to be hoped that western psychologists will not be deterred from examining their doctrines because they are expressed in unfamiliar, and often uncongenial language.

Value of emotion.—From a social point of view, tenderness or love is regarded as being valuable, and philosophers have not been wanting who tell us that when we feel love we are most in harmony with the universe, and that that is why the emotion is so valuable. A great many of the other emotions are, as we have seen, disapproved of, but there are one or two points which we must consider.

It is always a mistake to try to fit man's emotional nature into too simple a biological framework. The picture we are liable to have is of an ideal and limiting adequacy of response: the danger is no sooner apprehended than adequate responses are made leading to safety, the obstacle in our path is instantly swept away, the object of our lust immediately yields, and our preoccupation with the present such that we need not toy with what might be, nor grieve over departed friends. Under such circumstances the gap between the prompting state of tension and its relief would be reduced to a minimum. But the odd fact about human nature is that such a state of affairs is not relished. What man wants is not in accord with what he ought to want if the simple animal picture were an accurate representation of the facts. Many of us enjoy thrills, enjoy grief, enjoy getting angry, and we formulate that most unbiological doctrine that getting is better than having got. For most of us it is the intensity and variety of emotions that we value in

life. We do not go so far as to demand real danger, constant rage, and consistent ill-luck, but for each of us there is a kind of optimal intensity of aliveness which we enjoy; if we fall below it we are bored, and if life presses too hard we complain. Whether this is true of other animals it is impossible to say, but on the face of it it seems one of the features of human nature which make it difficult to fit human beings into the simple need-satisfaction framework.

C. Intellectual Emotions or Feelings.

Feelings of belief, disbelief and doubt.—Of these there is but little to be said. Like the other affective phenomena they are ultimate and indescribable.

As to what is happening when we have these feelings directed towards propositions, the psychologists who believe that there is a detailed correlation between what goes on in the mind and what goes on in the body will suggest that there must be either some patterned relationship between already existing systems in the nervous field and the configuration which corresponds to a proposition, in virtue of which we have the feeling of belief or disbelief towards it, or that the perception of propositions which we believe is transmitted along an easier path than is the case with those which are accompanied by a feeling of doubt. There is no evidence whatever for either view.

The circumstances which favour belief rather than doubt will be discussed in Chapter XX. There is a strong tendency, exemplified by McDougall (7), to relate the feelings of belief and doubt to action and the conative drives which lie behind it. " Belief," writes McDougall (7, p. 367), " is then confidence in respect of a proposition. Doubt is anxiety in respect of a proposition." Of course we do act on belief, and belief and doubt determine our behaviour, but the whole difficulty is that we believe and doubt on occasions when we are not engaged in action. Certainly doubt and anxiety may very well go together, but it hardly seems true to say that those of us who doubt the proposition,

" man survives the death of the body " are in a state anything like anxiety on the subject. There seems to be a purely intellectual doubting and believing which is not analogous to the feelings we have when we contemplate the probabilities involved in a course of action.

(1) McDougall. The Energies of Men.
(2) Cannon. Bodily Changes in Pain, Hunger, Fear, and Rage.
(3) Ward. Psychological Principles.
(4) Wittenburg. Symposium on Feelings and Emotions.
(5) Stern. Allgemeine Psychologie.
(6) Aveling. British Journal of Psychology, XX, p. 137.
(7) McDougall. An Outline of Psychology.

Chapter VI.

DEVELOPMENT.

In this chapter we are concerned with the phenomena which have to be noticed when we consider the development of the child into the adult. We have already dealt with the factors responsible for his learning of new responses, but there are others and more general features to which we must refer, if we are going to get some notion of the way a consolidated personality or character is built up. The whole subject is best treated in terms of instinctive desires ; we are dealing, indeed, with people rather than actual reactions, and the terminology of "tendencies," "desires," "urges" and so forth is by far the most convenient for our purpose.

We start, then, with the child, to whom we attribute urges which may vary in strength from individual to individual. He has a certain intelligence-capacity which, under favourable circumstances, will develop, but which has limits set to its development by its innate nature. He has a certain temperament which may vary with circumstances, some factors of which may, however, be fixed. He has, also, certain physical characteristics which may or may not be alterable : functioning ability of eye, ear, etc. The question now is, what happens besides the acquirement of habits and learning of new responses, to turn the child into the adult with the organised system of interests, prejudices, sensibilities, loyalties, which we call his "character" ?

Sexual development.—According to Freudian theory, analysis reveals a series of steps in the development of the sex-instinct. We must remember that the name "sex-instinct" does not mean for psycho-analysis exactly what it

appears to mean. Adult sexual life seems more complicated than at first sight appears, and includes interests and activities which are not purely procreative. From the analysis of symptoms, the Freudian envisages such complications as being the preservation of childish interests which once occupied the foreground in sexual life and which in the normal adult are subordinate to the sexual functions *par excellence*. To help us cope with the very complicated state of affairs which they have unravelled they picture a force—the libido—which operates successively in various different ways until at last, at the age of puberty, it bursts forth after a period of relative quiescence, during which something else is happening, into full sexual vigour in the ordinary sense. We must also distinguish between sexually-toned activities, which occupy libidual attention during their successive stages, and the objective towards which the libido is directed.

The predominance of certain activities in childhood is expressed by the following " phases " through which sexual development is supposed to pass :

Oral phase :	I.	Sucking, swallowing (incorporating).
	II.	Biting, devouring (destroying).
Anal phase :	I.	Expelling fæces.
	II.	Retaining fæces.
Genital phase.		Touching, exhibiting, etc.

These phases follow one another between the ages of birth to about five years. Then follows the " latent period " during which repressions are consolidated, and sublimations formed.

Then comes puberty and a reactivation of the genital interests and such others as have survived development.

The first objective is the Self, then the " libido " is thought of as being directed outwards on to one or other (or both) of the parents, and finally, if all goes well, the libido will be freed from its " fixation " on the parental objective and will attach itself to a love-object of the opposite sex.

In the case of the female a very complicated development

is called for. The girl directs her love to her mother at first and then transfers her affection to her father. That this happens seems very probable, but psycho-analysts are divided on the question of why it occurs. According to one theory the female child is angry because she has no penis and turns to the father because he has one; according to the rival theory there is some innate factor at work determining the change, relatively independent of experiential circumstances. According to both parties the change is closely related to a change in genital sensitivity (1).

With this complicated programme in front of it, it is no wonder that we are all different, and that many of us do not completely develop. Indeed it is a tribute to our strength that so many of us come through. The theory has met, as may be imagined, with a considerable amount of criticism, but there can be no doubt that our attention is directed to certain aspects of human nature which we should very likely miss without its help. Whether the theory will stand the test of future investigations, we cannot say, but (1) it helps us to explain much that is left out of other psychological theories, (2) if it is true it is of very great importance, and (3) one cannot help feeling that much of the criticism with which it meets is rather due to prejudice than to scientific acumen.

Conscience and the super-ego.—As we grow up we learn not to do things which will (*a*) render us liable to loss of parental love and protection, (*b*) bring us pain, (*c*) involve social obloquy. Any desire, whose satisfaction leads to such results as these is condemned. It is as though we progressively develop an organised system of what is allowed, and all desires have to fit in with the pattern if they are going to get satisfaction. Many desires are, as one might say, neutral, and pass into the pattern without question, but many of them are held up at the barrier and conscience is called in to examine them. According to the analysts the restrictive forces with which we are concerned may be unexpectedly severe because of a fantastic element which has played a part in their implantation, so that we are not surprised to learn

that conscience, a name we give to these restrictive forces taken collectively, varies in its structure from person to person, and *what* will be forbidden by conscience is further complicated by the fact that a pleasure which seems so innocuous to some will be associated with forbidden material in the experience of another and therefore come under the ban of restriction—indeed the conscience of some people seems to attack every pleasure-seeking impulse that presents itself.

When a strict and omnivorous conscience has been developed, the pressure against it is obviously very great, the stricter the laws the more rebellious the people are likely to be, and the very sight of others indulging in pleasures forbidden to oneself may cause such a strained internal situation that conscience inspires a crusade against the sinfulness one cannot bear to see. It is further possible that one punishes the sins of others, not only because the spectacle is an unbearable temptation to oneself, but because, by identifying oneself with the sinner, in punishing him one punishes oneself vicariously for harbouring the same desires.

This voice of society, or our parents, or our masters, which we have taken in to ourselves (introjected) and which criticises us and threatens us, is called by the psycho-analysts the "Super-ego." On their view the super-ego is not only the conscious conscience, but operates below the level of consciousness, viciously criticising and darkly threatening unconscious impulses as well as those of which we are aware. We thus have inside us a hidden guiltiness, a guiltiness which is not realistically based, but which is rooted in childish fantasy. This corner of the psycho-analytic framework is useful for the interpretation of those two strange but familiar cases in which we seem to observe people positively courting disaster, or so behaving that it looks as though they really desired things to go wrong with them. Alexander and Staub (2) suggest that people even commit crimes in order to go to prison and thus assuage their internal guilt attitude. Certainly there are people who have a genius for misfortune, and perhaps a light may be thrown on their characters if

we look at them with this interpretative scheme in our minds.

From all this it follows that a considerable amount of moral education consists in the development of a system of inhibitions, and the human tendency to project his internal condition into his conception of the outside world will lead to the educative mechanism being linked up with such superhuman entities as are conceived to be dominating the destinies of mankind. The principle is that we increase our stock of inhibitions in order to gain security from real or imaginary dangers ; they are the price we pay for love and social approval. At the same time we put a terrific strain on ourselves, and those persons who bulk large in the moral educational environment of the child will do well to reflect on the dark side of conscience as well as on the light.

Few people will dispute that the inhibitions of conscience are derived from experience. It may be that certain inhibitions (incest ban) are inherited, but we then look back into the history of our ancestors to find out what experiences they must have had to form so strong a restrictive force—whose strength itself indicates a strong force to be kept under.

Those psychologists who look for physiological formulation will agree, and turn to all the evidence for inhibitive nerve impulses in physiological literature. They will speak in terms of inhibitive impulses, where we have been speaking of the restrictions of conscience, they will regard the picture of the ego and the super-ego with disapproval as being mere imaginative twaddle, and this is only natural because they are more interested in neuro-muscular preparations than in human beings.

We may, perhaps, add a further factor which affects conscience : development itself. When we have a series of stages, one of which succeeds another by virtue of some internally developing force, by virtue, that is to say, of internal factors and not environmental ones, the succeeding stage tends to disapprove of the preceding stage. It may, therefore, not need environmental correction to inhibit a

desire when that desire belongs to a phase of development which has been passed.

Furthermore we must correct a too personal a view of conscience by reminding ourselves that the current morality code of any culture-pattern is, as it were, the hardened projection of common elements in the consciences of the individuals who make up the community. A child is born into a social environment which already has, as part of its quality, a certain ill-defined moral atmosphere, and there is some kind of interaction between the conscience of the individual and the moral atmosphere into which he is born, each modifying the other.

All this, however, involves an " experience " view of the derivation of conscience, which many people will not find altogether in accord with their own views. The position is this: we see that many prohibitions of conscience are obviously derived from experience, why should they not all be so derived? Why should we assume the existence of some innate " boniform " faculty which will tell us what not to do, experience or no experience? According to the " experience " view knowledge of what not to do is learnt by experience, and experience alone, when we press the matter far enough.

When we come to the positive dictates of conscience, the position is not quite so clear. Granted we avoid doing this or that because we hope to secure love by inhibiting ourselves, do we set up our ideals in accordance with the same principles? The ideals which cause the bother are the anti-individualistic ideals, and the odd thing is that though they frequently do not pay, and frequently cause us a good deal of trouble and even pain, we persist in pursuing them. Doubtless a great deal of anti-individualistic language is of the nature of punishment seeking: " I am a wretched creature, I do not count," but not all " goodness " can be disposed of in that way. It is interesting to reflect that the psychology of " badness " is complicated and full, but goodness makes us feel a little shy. Much can be accounted for on a basis of our social natures. Another suggestion is

that we love other people with a desexualised libidinal love, and doubtless there is much to be said for that view, but ideals of an anti-individualistic nature are not all concerned with individual other people. We sublimate our repressed desires, and lost dogs take the place of the babies we should like to have. Again, this will account for much altruistic effort. But there is a kind of ideal, which some people do seem to have before them, perhaps more in the East than in the West, of an absorption of individuality into something else, an ideal which presents the individual as a vehicle of life, carrying out the duties of human existence, but having, *quâ* individual embodiment, no value or importance. Such writers as Jung, Bergson and Heard take such intimations of a larger and more important something, into which we can, and should, merge, seriously. Perhaps it is the feeling in the individual of the great stream of life which runs through him (Bergson), perhaps it is a sense of the underlying unity of mankind (Jung, Heard), whatever may be the ultimate interpretation, undoubtedly we have a problem here for psychologists to solve. One cannot help feeling that the reason why it has been neglected by so many is that they find themselves unsympathetic towards the metaphysical veiling which is apt to accrete round problems of this nature.

Integration.—In dealing with the development of conscience, we assumed that conscience is developed by every one. We must now consider development from another point of view.

The child does not start with the psychological unity of the adult; he has relatively co-ordinated impulses which are not centralised round a central theme.

One of the most important aspects of development, and one in respect of which people differ enormously, is "integration." The development of character consists in building up a well-organised structure, such that there is a certain relation of coherence between what we do at one time and what we do at another. We develop certain skills, such as reading, writing, typing and walking, and

these are at the disposal of our desires to use for their satisfaction. But the desires themselves grow into a system.

There is a scale of integration, at one end of which we have unified characters, all of whose behaviour fits in with a pattern, and at the other end we have the "impulsive" character who falls a victim to any impulse called forth by the situation at the moment, and whose behaviour does not conform to any principle of organisation at all.

Another scale crosses this one: the scale of "richness." On the one hand we have a "poor," though perhaps well-organised system, whose behaviour displays a rigid and narrow structure; people who are dominated by a narrow "ideal," money-making or righteousness of a certain order. On the other hand we have a "rich" organisation which includes a multitude of organised interests and still retains a certain coherence throughout the whole. Furthermore, people may alter; a rigid organisation may break down, or a person may develop more than one dominant system and these may alternate from time to time.

We shall see that the notion of integration is important in the theory of the "will."

When impulsiveness reaches a certain pitch of disorganisation we have a form of "moral imbecility" which has been investigated by Dr. Reich (3). Such persons naturally are liable to come into conflict with the police, and the implantation of inhibitions into them is a matter of grave concern.

According to one school of Freudian psycho-analysts it is possible for a person to grow up without the organising influence of a super-ego, and such "impulsive characters" might be instances of this. According to another school (Klein, 4) the development of a restrictive organisation is inevitable, and cases of "impulsiveness" are due to an attempt on the part of such personalities to "try out" all sorts of forms of behaviour in order to convince themselves that the dangers which they unconsciously fear are unreal (5, p. 417).

Besides such "impulsive" characters, lack of integration

characterises the behaviour of mentally deficient children, whose distractibility comes from the lack of organisation in their structures.

Sentiments.—There is another aspect of integration which has been dealt with at length by Shand (6) in his " Foundations of Character." The point here is, not so much that the impulses and tendencies get integrated into a personality system, as that our interests and therefore the liability to emotion, get centred round relatively permanent objectives. So far as any theory goes, which contents itself with enumerating typical responses, classifying neuro-muscular energy-paths, or analysing the resolution of field-tensions, we might pass from objective to objective, feeling lovingly at one time, antagonistic at another time, frightened at another, which would leave out an important feature, which is so obvious and familiar that we do not notice it. We live our lives in a world of persisting entities, towards which we have attitudes or, as Shand calls them, " sentiments," and these sentiments, while not facts of experience, are hypothetical structural features of ourselves in virtue of which we have certain emotional experiences, and certain liabilities to behave in certain ways, under suitable circumstances.

When we are in love with some one, it does not mean that we only experience the emotion of loving, it means that we are in some way tied to the other person so that we shall be liable to a variety of emotions determined in their quality by the vicissitudes of the objective, our apprehension of our relation to the objective, the presence of the objective and so forth ; we shall be pleased when they are successful, grieved when they are unhappy, sad when they go, and gratified when their enemies meet with disaster. When we are " in hate," the same thing is true of us with suitable modification. The existence of a sentiment of love towards A, may give rise to a sentiment of hate towards B if A shows more attention to B than to ourselves, and thus we generate a sentiment of jealousy. This will be further complicated by our love for ourselves (our self-regarding sentiment),

and we may hate B because of wounded self-esteem as well as because we get less of A's attention. Psycho-analytic research has shown that our sentiments are extraordinarily complex. The simple love-plan, or hate-plan is seldom realised. The love is tinged with hate, and hate with love. We may not be wholly sorry when those we love meet with mild disasters ; at least we can help them, get their gratitude which will bind them to us, and after all it serves them right for not having treated us properly. We do not always simply seek the extermination of our enemy, we may like to preserve him for private bullying, and take pains to protect our "preserves." Our self-regarding sentiment, besides making us upset if our pride is wounded, makes us strive to have those qualities which we believe will extract approbation from others, as from a "cloud of invisible witnesses," and is regarded by McDougall as a valuable factor in moral education. People vary in the "depth" and persistence of their sentiments. Some people have several sentiments of love towards several people and others insist that one "ought" only to have one deep sentiment of love and, perhaps a few shallow ones. Some people flit from love to love, and no objective persists as an objective for more than a month or a year, others, while unfaithful, may still pride themselves on being constant.

Now just above we spoke as though a "sentiment" was something that does something ; and the language is natural, but confusing. The concept of "sentiment" is analogous in function to the concept of instinct-urge. We notice a certain coherence in behaviour, and it is helpful in our interpretation of it that we should refer it to the end towards which it is directed. We conceive of the instinct or urge as lying there latent, even when it is not manifesting itself, and this helps us to convey the unity which we feel to be an important characteristic of a person's life. When we consider a person's behaviour, not from the point of view of the purpose which each piece of behaviour serves, but from the point of view of the objects or ideas *about* which he acts, we find the need of the same kind of unifying notion,

and it is this need which the concept of the " Sentiment " attempts to satisfy.

When we have a sentiment towards an object, sometimes we feel one way and sometimes another, but in so far as the sentiment in question is at the moment operative, we feel and behave in some sense *about* its object ; though our feelings may be directed to something else, they are concerned with that something else in virtue of its relation to the object towards which we have the sentiment. The concept of " sentiment " is a way of coping with this organised concentration of our interests round objects. It is not an ultimate urge, but a relatively permanent liability for the manifestation of ultimate urges among certain channels. The " shape " of each sentiment is given by considering what situations will arouse what emotions, while the objective towards which the sentiment is said to be felt is that round which the emotional liabilities, varying from situation to situation, revolve.

In view, perhaps, of its importance to ourselves, we are constantly envisaging ourselves as the objective of sentiments in the lives of others, when really we have merely been the stimulus of a passing and relatively independent disturbance. If we hear that an unpleasant remark has been made about us, we are apt to see it as the expression of a system of hate, when it may well have been the vehicle of temporary irritation.

Ego-centricity.—In the lives of most adults there is a gulf between the " subjective " world, and the world of reality. The " objective " world lies over against him, and has to be respected. It conflicts only too frequently with his wishes, and the distinction between what he wants and what is the case is of the utmost importance.

This position has been won after years of experience. There is reason to believe that the world of the child is not severed into these opponent parts from the start, but that at first the subjective forces dominate the field.

The child animates the objective world in terms of his own feelings of action ; to the child causality means " making "

and has not degenerated into " functional dependence." What matters to him when he deals with objects and people is how they fit in with his interests at the moment ; they have but little independent validity. Only gradually does the objective world detach itself from subjective entanglements and develop its characteristic independence.

This will mean that children will not easily be induced to play with one another, because they are incapable of co-operation, which involves allowing some importance to other people's wishes.

Dr. Piaget (7) has made an elaborate study of children's ideas and behaviour from this point of view.

Another symptom of " ego-centricity " is the " omnipotence of thought." If the outside world does not have to be taken into account because its independence is not yet fully appreciated, the all-important distinction between reality and desire is not likely to be made. This means that the wish will be tantamount to the act, and indeed, it is doubtless on account of bitter disappointments that the sense of reality is developed.

The " omnipotence of thought " is important for the understanding of magical incantation, and also for the understanding of unconscious processes. The savage has not yet acquired the notion of a world indifferent to his intentions, and the unconscious processes operate on an " ego-centric " infantile basis. This is why there are unconscious feelings of guilt in the breast of the blameless, and this accounts for the development of symbolic representation. What matters to the unconscious is that aggressive desires are harboured, and since there is no essential difference between the desire and its gratification, guilt and fear are aroused by the presence of the desire alone. Owing to the fact that the same unconscious interest is aroused by a variety of different objects, the unity of the interest will take priority over objective differences, and one thing can stand for another because of the subjective identity of the desire with which they are both connected.

The ego-centricity of the child has been used to interpret

certain features of children's drawings. Volkelt (8) examined the reproduction of a cylinder by children, and found that they frequently drew the circles at top and bottom as though they were presented in the frontal-parallel plane, as well as the sides of the cylinder. Similarly a child will draw a picture of a human being with the parts present but in relations to one another which are incorrect (*e.g.* side-face with two eyes showing). This is sometimes expressed by saying that children draw "conceptually," *i.e.* from the general concepts involved, rather than from an objective model.

There is another way in which deficiency in objective analysis displays itself. "A two-year old child, although he could not identify a single letter or a single word, was able to find in his book any of his favourite poems or stories which were asked for." They "must have been recognised on the basis of the general 'look' or pattern of the page" (9, p. 233).

The point seems to be that the early impressions of the child are of the form of general patterns, and leave as "traces" ill-analysed configurations, which, when they come into play for the purposes of reproduction, may lead to the drawing of wrongfully related parts. It need hardly be remarked that it is very unsafe to infer from reproductions to original experience.

Learning by experience.—It will be seen that integration, or systematisation is the keynote of development. We ourselves become integrated systems of interest, our interests are systematically centred round relatively permanent objectives and lastly, our beliefs are organised into a system of beliefs, or a "body of knowledge" which we use to help us satisfy our desires. This body of beliefs is partly derived from immediate believing acceptation of what we are told and what we read, and partly derived from "personal" experience. We pass from particular instances of a connection to a generalisation. Our desires and emotions may modify our jump from the evidence to the conclusion, and may prevent our correcting our conclusions

by making us not notice, or not give full weight to, instances which do not fit in with it, but some other factors seem to be at work as well, capable, occasionally, of counteracting the temptation to come to conclusions which would satisfy desire rather than reason. We can judge probabilities, we compare one conclusion with another, and we build frameworks by means of which we try to interpret particular instances. To say that we do this "with our reason" is not to give an explanation, but to classify a set of activities, which have special importance because they have, or claim to have, an import transcending themselves. Whether we are ever right when we make these generalisations, or build these explanatory constructs, is a matter for philosophers to decide.

Every particular act, then, is to be interpreted with reference to the system of systems which is "myself," and every stimulus will make a mark, only by coming to terms with the condition of the system at the moment, which, in its turn is to be understood by reference to these developmental factors we have been considering.

Adaptation.—Furthermore this "system of systems" itself must be regarded as in some way incorporating its environment. The environmental conditions peacefully penetrate the organism and set up responses which tend to become more and more automatic, *i.e.* more and more "embedded," the less these conditions vary. Thus we become "temporarily adapted" to loud noises, certain visual stimuli, and certain tactual excitations, when these stimuli are so constantly repeated that we can afford to neglect them; similarly we become relatively "permanently adapted" to a regime of life, and an intellectual discipline. What at first was strange and demanded conscious application, now seems "natural"—accepted as part of the universe in which we live. In this way we "imbibe" (and the verb is significant, for we take it into ourselves) an intellectual atmosphere and a cultural *milieu.*

Regression.—The hold which we have on the complexity of organisation we have reached is precarious. Drugs, *e.g.*

alcohol, may undermine for the time being the latest acquired controls, and an inability to deal with the problems of adult life may lead to our taking refuge in the interests which dominated our life as infants. Freud has shown that nearly all the symptoms of mental disease show indications of regression to infantile enjoyments.

Similarly, if the " tone " of an institution centres round young persons, the adults who are implicated tend to regress to their level. " When men and boys live together in a more or less self-contained communal life, the men more easily acquire the viewpoints of the boys than the boys acquire those of the men " (10, p. 142).

(1) Freud. New Introductory Lectures to Psychoanalysis.
(2) Alexander and Staub. Der Verbrecher und seine Richter.
(3) Reich. Der Triebhafte Charakter.
(4) Klein. The Psychoanalysis of Children.
(5) Isaacs. Social Development in Young Children.
(6) Shand. The Foundations of Character.
(7) Piaget. (i) The Child's Conception of the World ; (ii) Judgment and Reasoning in the Child.
(8) Volkelt. Fortschritte der experimentellen Kinderpsychologie.
(9) Curti. Child Psychology.
(10) Benney. Low Company.

Chapter VII.

CONFLICT.

We have seen that some responses to the environment are more or less beyond our control, and that others, learnt and practised, become more and more automatic, grow in independence, and free themselves from the necessity of continued conscious attention. There is also a third group, characterised, from an introspective point of view, by the presence of that peculiar kind of conscious application that we call " willing." In this last class the action seems to emanate from within ; we decide on an act, and this decision seems to be a cause-factor determining its performance.

The will and the act.—The first question is : how can we best conceive of the will as causing the act to take place ?

(1) The physiologically-minded psychologists will say that the act is caused by previous happenings in the nervous system, and that the actual decision plays no effective part in the business at all. The experience, " I *will* do so and so " is the conscious accompaniment of physiological processes, and is rather a by-product than a force.

The physiological processes themselves may be pictured as operating " mechanically " ; something occurring in one place making something happen in another place and so on, or they may be pictured " organismically " : the body as a whole is thrown out of equilibrium and is trying to re-establish equilibrium once more. In either case the mental performance of willing does not feature.

We deal with the difficulties of physiological interpretation elsewhere, and all that need be said here is that the physiological picture is not helpful to us when we are trying to

understand the psychology of volition because we cannot identify the physiological processes which are alleged to be involved.

(2) Attending to motor images. "Try to feel as if you were crooking your finger, whilst keeping it straight. In a minute it will fairly tingle with the imaginary change of position; yet it will not sensibly move, because its not really moving is also a part of what you have in mind. Drop this idea, think of the movement purely and simply, with all brakes off: and, presto! it takes place with no effort at all" (1, Vol. II, p. 527).

In this celebrated passage we have the theory that motor images are so closely associated with the actual innervations to which they refer, that the concentration of attention on them makes them realise themselves.

This is not a satisfactory account of the matter because (*a*) we can have the experience of willing to do something without having kinæsthetic images of the acts we are about to perform, and yet we can perform those acts; (*b*) we can have kinæsthetic images and concentrate on them and yet not be able to perform the acts in question. It is possible to move parts of the body (*e.g.* ears), which are not under voluntary control, by artificial stimulation, and no amount of contemplation of the kinæsthetic images will produce the movement.

The mistake seems to be the endowment of the conscious I with a power to inflate an idea so that it gets vitalised into operation, and to deflate competitive ideas so that they cannot prevent action from taking place.

(3) Where then shall we put the energetic force that we seem to be talking about when we speak of willing? The answer seems to be that we must not separate mind and body and conceive of them as standing over against one another, but that we should rather think of them as two ways of functioning on the part of the organism as a whole. The force of willing is the vital force of the organism, which manifests itself, sometimes in mental happenings and sometimes in overt behaviour. When a situation has

to be met, or when an impulse demands satisfaction, it may be that the organism has a technique ready to hand which can operate without friction, and if this is the case there is no experience of willing. If, however, the organism has to overcome a difficulty then there will be an experience of willing, which will be the more effortful the greater the complexity of the obstacle which has to be overcome.

The obstacle may be an external difficulty, or it may be a matter of internal friction. The latter situation will be discussed in a later paragraph, and leads to a further refinement of our conception of the organism.

The actual limbs of organisms are, from a functional point of view, variously organised, and the acquirement of a physical skill may be regarded as an increase in functional organisation. The hand of the person who is learning the piano has the same parts as the hand of the same person when he has learnt to play, but whereas in the early stages his fingers are "all over the place," when he has acquired the skill they become functionally organised so that he can "do what he likes with them." Looked at from this point of view, the conscious I *represents* the organised organism, but does not *operate* it; the "thing" that has the energy at its disposal is the organism and not a conscious I mysteriously connected with it. The result is that unless the ears, for example, are integrated with the rest of the organism, they will not be accessible to the organism should it want to move them, and it is not surprising that the conscious I cannot do anything in the matter, save consider methods whereby those organs can be brought into the functional totality which the organism is. How this has been done is described by Bair (2).

Conflict and will.—When the desire to do something, or the desire not to do something meets with internal resistance there may ensue a temporary splitting of the total personality. The mind seems turned into a court of law and each party puts forward its best case. As the pros and cons of the contemplated action are considered, the implications of the act itself form a kind of aura round the idea of the act making

it a more and more complicated proposition. *What* we are deciding to do changes as we think about it. I am faced with the problem: shall I or shall I not sit down to write this chapter? One party makes me see "sitting down and writing" as "sitting down and writing-something-that-has-got-to-be-done-sometime," the other party makes me see "sitting down and writing something-that-has-got-to-be-done-sometime-but-if-badly-done-will-have-to-be-done-all-over-again-and-you-ought-to-be-out-in-the-open-air. The first party adds to all that: . . . and-yet-you-will-never-get-the-thing-done-if-you-keep-out-in-the-open-air," and so the wrangling goes on.

After it has gone on some time the situation may itself be unpleasant and it may be decided to decide the quarrel by tossing a penny. The verdict of heads or tails may or may not be accepted.

This, however, though frequent, is not the normal course of events. Usually a decision and an "act of willing" take place. The forces in favour of the most recent presentation of the objective of desire win—they are simply stronger than the forces they are fighting against. Such a view the psychologist must take, unless he is going to abandon the field of willing to indeterminism. According to the thoroughgoing determinist the resulting activity is the resultant of quantitatively different forces.

It is not always realised exactly what the indeterminist lets himself in for. He has to suppose that, with regard to the alternatives presented for choice, there is a range of alternatives which would all be equally likely supposing we knew all the operative factors. Take the instance of a hungry man and an accessible loaf of bread to which he has no legal right. Will he, or will he not steal? We may admit cause factors which, in accordance with rules, bring him into the neighbourhood of the loaf of bread, and make him feel hungry; we may admit that cause factors, again instancing "laws of nature," operate making him perceive a loaf of bread rather than a chippendale sideboard. Presumably, again, the formulation of the pros and cons about taking the

loaf of bread will be determined by his education, and perhaps the very fact that he does not immediately take the loaf may be traced to his upbringing, in such a way that we could say : anyone with the same constitution, brought up in the same way would refrain from immediately taking the loaf under the same circumstances. But now what will happen ? He envisages courses of action—perhaps two : taking or not taking. Now if his will is " free," however much we knew about him, we could never show any evidence which would make it more probable that he would take or not take that loaf. We can never predict with certainty, that is admitted ; all we can do is to show that the weight of evidence, in terms of the probabilities attaching to the generalisation or laws which are exemplified in a given case, is in favour of our accepting this alternative rather than that. But if the will is free *no* amount of evidence makes it more reasonable to expect one result rather than another.

Since we cannot predict what people will do with any considerable degree of probability, and since we are constantly being surprised by people's behaviour, it may be that there is an indeterminate factor present, but psychologists are naturally loath to accept it.

Of course from an introspective point of view we are free, and we behave as though we are free, so that practically it makes no difference whether we are " really " free or not ; we live in a behavioural world of free agents. It is perhaps true that the *belief* that we are not free might cause us to act one way rather than another, and our tendency to rehabilitate ourselves, if we observe too large a gap between general intention or ideal and performance, might make use of a deterministic excuse : " it was not my fault " ; but in the first place it is very doubtful whether philosophical beliefs do have very much effect on behaviour, indeed their intellectual validity is somewhat under suspicion if they do ; and in the second place if we did not have the principle of determinism at hand as an excuse, we should very soon find another.

To return to the conflict itself : between what is the

conflict taking place? We have a desire, formulated in words or imagery, to do so and so, and "part of us" says "No"; a discussion ensues, a choice is made: the stronger party wins. If we leave the matter there, we give an incomplete account, because we shall not have a satisfactory setting for the conception of "a strong will." It would clearly be paradoxical to say that we were strong-willed in whatever course we take, after a battle of volition such as we have described, simply on the grounds that the strongest impulse has won. To say this renders "weak-willed" a meaningless conception, which it obviously is not. The drunkard who "gives way" to every temptation to "have another" is not strong-willed because his desire for drink overcomes any resistance he may have put up against it. His weakness, on the contrary, lies in the lack of integration of his personality. If we "can't help" doing this or that, it is the defeat of our will, rather than the victory of an impulse, that we consider. When an impulse is countered by the organised overt personality as a whole, when it does not "fit in" with the ideal of the self-regarding sentiment, it comes up against the will. A strong will, therefore, means a well-integrated personality with power to keep out all that does not fit in with its pattern. The will is no special separate force, but that which an isolated impulse has to contend with. It is felt to be peculiarly "I," in fact the "will" is that system of forces with which the person identifies himself.

As the organism develops, it grows a *façade* which it presents to the world; some impulses are allowable and some are not, some are in accord with the personality pattern which is being developed, and some are not. The total vital energy of the organism includes all its impulses, the "will" is that organising force which we conceive of as holding the overt personality together. For this reason we may say, when we have done something which our wills were powerless to prevent: "I was not myself when I did it." In some cases the split between the organisation and the isolated impulse which demands satisfaction is so deep that the "temptation" is actually felt to come from outside the

person altogether in the form of hallucinated orders, or mysterious compulsions.

Pathology of the will.—A variety of causes may operate in producing a breakdown of the organisation, giving rise to abnormalities in the experience of willing:

(*a*) *Aboulia.*—A state in which the patient has the experience of willing, but feels himself incapable of carrying out his volitions. De Quincey has described this experience in his " Confessions."

(*b*) A state in which the will is felt to be paralysed by an overwhelming impulsion in the opposite direction: *e.g.* obsession, or phobia.

(*c*) *Folie de doute.*—A state in which the volition is hampered by doubts as to the safety or propriety of the actions which he contemplates.

(*d*) A state of disorganisation in which the subject avoids doing something by " inventing " other and less disagreeable tasks.

(*e*) A state, similar to the last, in which the subject is faced with a number of tasks but finds that when he starts on one, he cannot keep his attention fixed on it because he is constantly being interrupted by the others. This condition is one of the symptoms of " central fatigue."

Non-conscious conflict.—In the case of conflicts which form the material of volition, the self, with its organisation, and the " to do " or " not to do " which challenge the will, are both conscious. Whether there are factors present which are inaccessible to consciousness is a matter to be considered, but at least we are aware of conflict and the two parties confront one another, each demanding control of our behaviour. Modern psychologists and physiologists, however, recognise that conflict need not exhibit itself so openly. The reflexologists have pointed out that when conditioned response does not come in answer to the conditioning stimulus, it is not necessarily abolished, it may be merely inhibited. Everyday life teaches us that people are not always the best judges of their own motives, and we cannot help thinking that sometimes there is something which prevents a motive,

which a person would not like to own to, from coming into his mind. We accuse this person of jealousy, that person of class-consciousness, and a third of meddlesomeness and meet with indignant denials, and yet, the more indignant the denial, the more certain we are that we have touched on a sore spot. We feel that when people betray their feelings they are betraying their internal mechanism ; we feel that people do not make a fuss unless there is something to make a fuss about, unless, that is to say, something important inside them is being excited. Violent disapproval, backed up with reckless reasoning, makes us feel that interests are vested somewhere in the neighbourhood, and we see at once that disgust is often a defence against temptation, however vigorously the suggestion would be repelled by the person displaying it. Such worldly wisdom is possessed by all of us who are interested in human beings, and the technique of interpreting character as involving unacknowledged impulses has been exploited in human intercourse ever since our knowledge of one another became at all articulate.

The technique is this : we observe behaviour which does not fit the professions which are made about it, and we believe the behaviour more than the words. We seek to render the behaviour meaningful by postulating unconscious motives—X is behaving " as if " he were jealous, therefore he is unconsciously jealous, and so forth. What makes us feel that some special interpretation is called for is the inconsistency between word and deed, the fact that behaviour does not fit in with the pretensions of the person behaving. Our normal common-sense penetration does not carry us far. When we find people are behaving in a way which seems to have no meaningfulness in it at all, we break down and say that they are suffering from nerves, or that a " screw loose " has damaged the functioning of the machine. There are, however, several schools of psychology who have gone further in their interpretative schemes than we have, but in the same direction : finding meaningfulness in all behaviour, even the most unco-ordinated. By far the most elaborate of these schemes is that associated with

the Freudian school of Psychoanalysis. The material which has led to its construction is derived from the trains of thought and emotional displays of patients suffering from mental disturbances, but the light which has been thrown by psycho-analytic theory has led us to the conviction that mental abnormality is only normal oddity writ large. In fact the tables have been turned: "Normality may be a form of madness which goes unrecognised because it happens to be a good adaptation to reality" (3).

Freud.—It is impossible to give more than the barest outline of the Freudian interpretation-scheme. The most general principle is that as we grow up we are compelled to forgo a considerable amount of pleasure, and inhibit many of our impulses; these impulses do not just fade away, they persist, and are constantly being aroused, constantly having to be kept under by defence-mechanisms, and constantly causing us to have feelings and to do things which we find strange and odd until we discover the explanatory key.

The first question is: "How are the impulses which are repressed discovered?" Freud assumes an "interest theory" of association. When we let our minds ramble, without criticising what comes into them from a logical or ethical point of view, the series of ideas, words, pictures and so forth that occupy us are linked by subservience to the same interest, and the more we leave the critical side of us in abeyance, the more clearly will the interest display its ramifications. The ideas do not follow one another because of any fortuitous "chance" association but have an underlying emotional connection. We must not be surprised at the odd items that get connected up in this way, because our surprise would spring from the logically-thinking and ethically-judging part of ourselves which is just the part which is not responsible for, and therefore cannot understand, the sequence of ideas based on desire rather than reason. If, then, we want to interpret behaviour and experiences which do not manifest their true nature in their conscious content, we shall have to trace

back the interconnected ideas and experiences which are linked up with them by the unifying cement of the tendencies from which they spring.

Such is the method by means of which Freud has made his astonishing discoveries. He found, in the first place, that nearly all his patients had unsuccessful sexual lives, and by tracing back the freely-associated (*i.e.* not logically-associated) ideas connected with their dreams or their symptoms, he found that the interest-threads he followed led him into the strangest places. He found unmistakable evidence of unconscious pre-occupation with matters which independent investigation shows to be of absorbing interest to children. Lingering in the adult unconscious are desires associated with breast-sucking, defæcation, fear of the loss of the mother's love, hatred of (and at the same time love for) the father because of his intimate relations with the mother, and many other matters of which we had no idea, and which we repudiate at once.

These childish interests were reached by following up trains of ideas all of which are intimately connected with sex, and on those grounds Freud has insisted that the sex-life does not start at puberty, but at birth, in the sense that adult sex-life shows abundant traces of connection with desires which at one time were of paramount interest to the child, and, further, the interest in such matters which children are observed to have, has certain characteristics in common with the admittedly sexual interests of later years. Of course the tracing of symptoms and dreams back to infantile interests and desires is not as easy as it sounds. It is seldom that the ultimate infantile desires will come to consciousness, undisguised, and it is here that interpretation is called for. The position is that we are faced with the behaviour of an adult : neurotic symptoms, dreams, evidences of anger, feelings of anxiety, and so forth, and by asking him to trace back the emotionally-toned threads into his childhood we have information before us about his early experiences and interests. We make the assumption that an intelligible account can be given,

which will weave all these items into a coherent story, and on this assumption we make our interpretation, and infer what infantile interests he must have had if we are to understand his life-story completely.

Sometimes the patient himself sees the interpretation of the course which his ramblings and emotions have taken, and when this happens, or when he "accepts" the interpretation of the analyst, a profound change is made in his condition.

It is essential to realise that the interpretation which is given of a patient's symptoms and emotional displays is based on the assumption of meaningfulness; the apparently unconnected and uncoherent must be made to connect and cohere; if he is anxious, there is something for him to be anxious about, and if he hates, there must be grounds for his hatred. *What* he fears and *why* he hates may seem to us fantastic, but what seems fantastic to the conscious mind of the adult is stern reality to his infantile unconscious.

The theory is, then, that the love-force, or "libido," passes through a variety of developmental stages, which we have already mentioned on page 137. These stages are of two kinds: (1) a series of modes in which the libido is expressed, and (2) a series of objectives towards which the libido is directed. We think of the libido as "possessing" (technical: cathecting) a mode of action, a bodily function, an objective, or a part of the body, when these are "charged" with sexual importance.

At the various stages of series (1) the organism conceives of, and acts towards, the objectives of series (2) in a mode corresponding to the stage in question. This is not an easy notion to convey, but it is of great importance for the understanding of psycho-analytic theory. When a person is "golf mad" or "bridge mad," he may use the linguistic of golf or bridge to describe situations which have nothing whatever to do with the game—ordinary situations in which he happens to find himself: *e.g.* when he makes a smart retort, he might say, "I won that trick"; or when he sits next to a difficult partner at dinner he may make a "lucky

shot," talk gardening, her favourite subject, get " well up the fairway " before the fish, only to find himself " lost in the rough " after she has " driven off " with a remark about pruning. These frivolous examples indicate what is meant by looking at a situation or a person, or part of a person according to an interest-mode. Now children at the oral stage will react " orally," the way love presents itself to them is " oral-wise " (eating, incorporating, biting) ; children at the anal stage will, similarly, apprehend " anally " (retaining, or expelling, according to the level of the anal stage reached). At the genital stage any similarity with genitalia will be noticed and a genital mode will take the field. This means that the language of the libido after it has passed through all these stages, if it still retains echoes of its past dialects, will be exceedingly complicated, and there will be all kinds of meanings, which awake echoes of the past, but which are bewildering to the developed conscious mind : hence the variety of symbolic symptomology.

If this theory is correct it means that these natural functions of the child (sucking the breast or defæcation) are of enormous importance to it, and therefore any checking and controlling will be regarded by it as a hostile act, provoking antagonism, but if the child wants to keep the affection of its parents, and if it loves its parents, the antagonism will have to be repressed as well. Thus we have two kinds of repressed desire, libidinous and antagonistic.

It may well be asked how it is that these repressed desires can possibly have such a profound effect. From the adult's point of view, the child is a sweet plaything or a squawking nuisance, but the researches of Freud have taught us to think differently. To the child the refusal of the breast is the refusal of love, the correction of defæcatory vagaries is a proof of the hatred and hostility of the world, while the shrieks of despair, which we think so " naughty " when father and mother go out for a walk, are the expression of the horrors the child feels at what it apprehends as being left for ever. We call this " fantastic," and indeed the importance of " fantasy " is the next point to be considered.

The child is far more shattered by its training and the non-satisfaction of its desires than we realise. It apprehends restriction in exaggerated terms ; loss of love, even when this is out of the question from the point of view of the adult, is real enough to the child, and a very present danger. Its feelings of hatred and resentment have to be kept under because they may call forth retribution and vengeance from the very parties from whom love and protection are to be sought. And then there are the devastating effects of the " omnipotence of thought " to be brought into the picture. Not only is the child enraged at being thwarted, but the harbouring of aggressive hatred is regarded as being the same as the actual perpetration of attack, and therefore the outside world, hostile in any case, is regarded as the more dangerous because it has a certain excuse for wrecking vengeance. The punishment and the hostility are envisaged in terms appropriate to the various stages of libido development, and range from biting and eating to dismemberment of the most serious kind (castration complex).

And now we must add another source of danger. No sooner does the child become aware of the existence of other people and their relations to one another, than it gets entangled in a dramatic domestic situation. The male child, having its libido satisfied by and directed towards its mother, develops, for that reason, hostility, envy and jealousy of its father. The female child, after passing through a stage of devotion to the mother, transfers its affections to the father and enters on a path of rivalry with the mother. Here we have situations fraught with inhibition. There is the incest ban which forbids too close an intimacy with the parents and which renders the love relationship with them suspicious and in itself guilty and punishable, and then there is the hostility to the father (or mother), the ill-wishing him (her) and the desire to take his (her) place. The ill-wishing will take the form in the male of wanting to be as virile as the father, seeking (*a*) to satisfy antagonism and (*b*), by castration, to obtain his strength for himself, and in the female there will be found also a desire to take the place of the mother and

absorb the father, and, sometimes more, sometimes less elaborated, the desire to compensate for her own insufficiency by obtaining the emblem of the father's strength (masculine protest). The complex dynamic organisation which is precipitated by any particular family situation playing on any given constitution is called the " œdipus complex," after the legend which presents the essential elements in the family situation of the male.

All the way through this account we have used the terminology of adult conscious life ; we have spoken of jealousy, the child " apprehending " a situation as such and such, and " envisaging " this or that. The theory does not suppose that such language is accurate. The point is that something has to be imagined as going on in the child, which in an adult would give rise to experiences called by such names, if we are to understand the strange background upon which our conscious life is woven.

Here then we have, lying behind consciousness as it were, desires which are inhibited—aggressive and libidinal—cast in certain moulds (oral, anal, genital), and a complicated organisation of such impulses round the domestic situation. These desires meet with resistance, and this resistance is to be thought of in terms of defence against the threat of punishment, loss of love, and the fear of danger. There are therefore two surprising elements in the Freudian theory as outlined so far : in the first place, we had no idea that we harboured such desires in us, and in the second place, it is difficult for us to measure the enormity of the dangers to which the child feels itself to be exposed. There is a third surprising feature of this interpretative framework : the establishment of the internal resistance itself.

When the child desires something, *e.g.* to be fed, and when its desire is not satisfied, a state of unbearable tension is set up. This will give rise to aggressive impulsives, which, as we have already seen, are " projected " on to the outside world so that the outside world is apprehended as harbouring the same hatred towards the child as the child harbours towards it. The hostility of the outside world is propor-

tional to the child's own feelings rather than to the " real " facts of the case. The organism is therefore in a predicament. If desires arise which cannot be satisfied (*a*) unbearable tension is set up, and (*b*) danger threatens because of projected hostility. Something has to be done, and the organism is believed to take into itself (" introject "—oral technique) a parental control which operates nearer the source of the trouble and stems the impulses which are responsible for its difficulties. This is the basis for the " super-ego." The severity of its restrictions, the punishments which it threatens, derive ultimately from the child's own aggressiveness, but since this has been projected on to the parents, and since the " super-ego " is an incorporated parental control, it will have two sides to its nature ; on the one hand it will bear the marks of the " bad " and " cruel " parents who forbid and deny satisfaction, and on the other it will bear the marks of the " good," loving and ideal parents whom one wants to imitate, who look after one, and whom one also wants, in the " œdipus " situation, to supplant.

The total self is thus divided into three compartments : (1) the conscious *ego* whose business it is to guide the organism safely through the real dangers of the environment, in the execution of which it develops a system of knowledge, and to stear clear of the fantasied threats of the " super-ego " for which purpose it develops a system of morals and various avoidance mechanisms ; (2) the " *Id* " in which lie the sources of impulse, and (3) the " *Super-ego*," which does not keep step with the knowledge acquired by the ego, but still threatens terrific punishment if impulses of which it disapproves are allowed to manifest themselves. It is, indeed, this failure of the super-ego to grow up that lies at the root of most of our internal difficulties. When we read about the desires we harbour, and realise that they are infantile and that there is really not much harm in them, we cannot at first understand why the repressive part of ourselves should make so much fuss, and why they should have to manifest themselves —if they are able to do so—in such roundabout ways. When, however, we realise that the restrictions of the

super-ego are felt inside to be murderous threats, it becomes more understandable that the organism should shrink from behaving in a way which it feels to be fraught with such dangers.

But what happens when the internal conflict is such that the organism must allow some expression to its thwarted impulses ?

(*a*) *Sublimation*.—When we cannot relieve the tension by direct satisfaction of the tendency which is aroused, we can sometimes get a certain amount of satisfaction by means of a substitute act which drains off the energy along innocuous channels. When the channels which are used are socially useful, and therefore do not arouse the indignation of the super-ego, we call this form of " displaced " satisfaction " sublimation." Since all people are faced with the same kind of problems, culture patterns have been precipitated in which the satisfaction of impulses which cannot be allowed direct manifestation is catered for. This does not mean that all the elements of every culture pattern can be analysed without residue into symbolic satisfactions of unconscious urges, but that there is an interaction between sublimation and the development of cultural institutions. Hospitals afford satisfaction to unsatisfied love, the stock exchange brings out those traits in our character which are associated with excremental training, and we can express our antagonism against our fathers by operating against a government. Doubtless we should have hospitals, money markets and anti-governmental activities apart from their value as sublimatory drainage, but the fact that they do afford us satisfaction of this kind helps to determine their natures and makes for their persistence.

(*b*) If socially respectable satisfaction is impossible, we can relieve the tension somewhat by an indulgence in fantasy. Dreams, day-dreams and myths are safety-valves for unconscious desires. Dreams and day-dreams are personal and deal with personal problems in a private way, while myths are public day-dreams which cater for unconscious interests of a universal character.

(*c*) Sublimation and fantasy may not satisfy us. We may have to allow a less satisfactory incursion into our everyday lives. This may lead to the formation of a neurotic symptom. According to the Freudian theory neurotic symptoms are overt expressions of the conflict that is raging. There are three important kinds of symptom : bodily malfunctioning, phobias, and obsessions, and in the symptom both the " id " and the repressive forces will make themselves felt. The bodily symptom (*conversion hysteria*) may be a symbolic representation of the repressed desire, or it may be that the repressive forces are the ones which bulk larger : *e.g.* hysterical blindness is to be interpreted as a mechanism which prevents the patient seeing what is forbidden. In the *phobia* the patient may transplant the fearfulness of one object on to another which he can more easily deal with, though this is not the only meaning which a phobia may have. The *obsession* may be a technique for preventing symbolically something from happening which the " id " wants to happen. When the repressive forces have the greater " say " in the language of the symptom we speak of " reaction-formation," because the symptom gives evidence of an increase of the resistances against the pressure of desire. The symptom does not bring peace because the super-ego is angry that any expression is allowed at all, however distorted, of the forbidden interests, and therefore the symptom is always attended by an aura of anxiety and discomfort. In any case, of course, a great many symptoms (*e.g.* washing mania, hysterical vomiting, etc.) make life intolerable by their very nature.

(*d*) Our attempt to cope with reality and our internal crises may break down, and fantasy may control the machine. Under such circumstances a *psychosis* will develop. We then live out a dream whose content will be determined by our unconscious, and our view of the outside world will be altered, and even denied reality, by internal determinants.

What form of mental abnormality will be developed will depend on (1) our initial constitutions, (2) the experiences

which we have had, and which, in connection with (1) will have made more or less lasting differences to us, so that when we are faced with (3) special circumstances which put a strain on us, we are unable to cope with them, and " regress " to primitive ways out of the difficulty. We are said to be " fixated " with respect to infantile interests which have a persistent effect, and out of which we have not grown, and it can be roughly said that a fixation at the genital phase predisposes us to hysterical symptoms, a fixation at the anal phase predisposes us to obsessional symptoms, and a fixation at the oral phase predisposes us to psychotic symptoms, but in practice every constellation of symptoms will probably bear the marks of more than one fixation point.

If, then, according to this theory, we take the content of a man's preoccupations, we see that there are some of them which are in accord with his "real" situation, while some of them are important to him because of the relief which they afford to his internal dynamic situation. This relief is not always obtained by the same technique, and the following are some of the important ways in which the organism deals with its difficulties, techniques which lie behind the formation of symptoms in the widest sense :

(1) *Displacement.*—The aim of an impulse may be shifted on to an innocuous objective : *e.g.* one part of the body may replace in importance another part (displacement from below upwards) ; aggression against one person may " come out " in the form of temper against another.

(2) *Condensation.*—One item may absorb the attention of several interests. The figures in dreams may represent several persons at once.

(3) *Exclusion from consciousness.*—Material which is associated with impulses which are under the ban of repression may be rendered inaccessible to consciousness.

(4) *Reaction-formation.*—Disgusts, guilty feelings, and sense of sin are evidence that the barriers are being strengthened against " id " demands.

(5) *Projection.*—Processes within may be projected outside. This is of value because an externalised danger is

more easily dealt with than an internal one. An externalised threat of damnation or aggression projected on to an avoidable objective, can be coped with by avoidance mechanisms. The super-ego, too, is backed up by the structure of stable social institutions, so that when these institutions are felt to be insecure (a defaulting monarch, or a lenient judge) the organism may feel that its own stability is threatened.

(6) *Symbolic restitution.*—If desires are harboured and become too insistent, the organism feels as though the act has been actually committed, and symbolic acts of restitution may be made. This is thought to be responsible for a great deal of creative and philanthropic activity.

(7) *Conversion.*—An impulse may manifest itself by means of a bodily symptom, giving rise to "conversion hysteria."

(8) *Introjection.*—The organism may take an external objective into itself. We have seen that this is the mechanism involved in the setting up of the super-ego. It is also thought that a lost love-object can be introjected, and since our attitude towards all love-objects is "ambivalent," *i.e.* involves antagonism as well as love, the antagonism is now directed against the organism itself, giving rise to *melancholia.*

(9) *Testing out.*—A considerable amount of "naughtiness" in children and adults is interpreted as a means of reassuring the organism that the impulses, against which such terrifying penalties are internally threatened, are not so serious in their results after all.

Such are the more important techniques by means of which the organism deals with its internal economy.

Besides the formation of definite symptoms, there is another and more general way in which the vicissitudes of infantile moral education may make themselves felt. Certain general character traits are associated with childish experience. The child that feels itself to be neglected, because it does not have its craving for food satisfied as it wishes, may grow up embittered, clinging to others for help, impatient, and having a tendency to ask rather than to give. Again, the inevitable training in cleanliness may leave its mark in pedantry, and a passion for orderliness, while

parsimony and obstinacy are traced to the attitude of the infant towards evacuation.

Of course a full grasp of the complexities of psycho-analytic theory cannot be obtained from such a brief outline and the student must be referred to the books mentioned at the end of the chapter. The most important elements in the scheme are: (1) the lingering desires for infantile satisfactions, (2) the dangers believed to threaten the organism if those desires are satisfied, (3) the erection of the super-ego to deal with the desires at source, and (4) the symbolic language by means of which substitute satisfaction can be obtained in dreams, mythology, and symptom-formation.

The value of this complicated interpretive framework lies, of course, in its utility. If it helps us to understand behaviour it has value for that fact alone; if it enables us to influence behaviour it gains thereby increased probability, and the fruits of psycho-analytic practice certainly warrant our taking the theory seriously, however unexpected it may be in detail. There is also indirect evidence of its validity. If the theory is true, we should expect: (1) that there would be considerable opposition to its acceptance because the forces of the super-ego are operative in the direction of keeping such matters out of the mind, (2) that if we looked about we should find eating having some deep significance—some eating would be mysteriously repellant and some holy, (3) that defæcation would be a matter for a mixture of fascination and disgust, and (4) that many people would not be able to talk unemotionally about sex, killing, blood and even food. All these expectations are fulfilled.

It is important to stress the psychological orientation of this and the other theories which we are about to describe. They all attempt to interpret human behaviour in terms of symptomatology. The conscious motives are not found to be adequate for an understanding of people's natures, and non-conscious motivating forces have to be invented. This "Copernican" revolution is characteristic of a great deal of modern psychological thought. We have described the non-conscious motivating forces pictured by the Freudian

school, we are about to describe the non-conscious forces pictured by Adler and Jung, while modern sociology provides us with yet a further collection of forces—class interests in this case—in terms of which behaviour and ideology are to be understood. All these theories have this in common: they all regard conscious experiences as of secondary importance. Of course conscious experience and behaviour are the data they all start with, but they are not taken at their face value, but as symptomatic of the interaction of forces somewhere else.

Adler.—Dr. Adler, who had co-operated with Freud up to 1910, has developed an interpretive framework of his own. It is simpler and undoubtedly attractive to many who are emotionally repelled by the theories of the Freudian school. According to this view, the most important structural principle is inferiority. We are at a disadvantage during childhood, we want to be able to satisfy our desires and we are constantly being made to feel our impotence, and as a result of this we develop an attidude of inferiority which directs us towards compensation or avoidance. The question we always ask when faced with a symptom according to this theory, is: what advantage does the organism get out of it? Perhaps it may get attention, perhaps it may exercise greater control through weakness than ever it did through strength, perhaps it wants an excuse for failure ("if I were not so feeble, what could I not achieve?"). This "life-plan," as Adler calls it, directs our attention from reality, and because it is false, it is liable to lead us to disaster. By boasting, defensive rudeness, and avoidance mechanisms (homosexuality, *e.g.* is said to be a way of avoiding marriage) we may struggle through life without serious disabilities, but if we break down we shall "regress" to our past life, seize on some infantile expression which was successful *then* in compensating us, and use it *now* as a symptom. Thus infantile life is of as great importance to the Adlerian hypothesis as it is to the Freudian. The complaint which is made against the Adlerian school is that it "explains" so much by so little; a host of different symptoms are *all* explained by the same

hypothesis : inferiority complex. But why this symptom rather than that ? We are told that past experience gives the material out of which psycho-neurotic symptoms are built, but still we cannot help demanding greater detail. There is a general similarity running through cases of obsessional neurosis, which distinguishes them from, *e.g.* conversion hysteria ; in both cases the patient attracts attention and avoids responsibility, and the particular form taken by each method is doubtless an echo of childish life, but to say that a patient suffers from an obsessional neurosis because of an inferiority complex, without saying what special advantage the obsessional technique has for him over the conversion hysteria technique, is to give us too little information.

From the point of view of the Freudian scheme, the inferiority, from which we doubtless suffer, is sexual inferiority, while this theory of illness as compensation is incorporated in the Freudian picture as " secondary gain through illness," and it is admitted that the " secondary gain " may be so valuable as to be a serious stumbling-block to recovery.

This does not mean that " Individual Psychology," as Adlerian psychology is called, is not valuable. As the name implies, it concentrates our attention on the interpretation of any symptom in terms of the way in which it fits into the life-pattern of the individual, and this, we have seen, is a valuable principle. Further, the " inferiority complex " has great interpretive value. The " psychology " of the little provincial authority who prides himself on being " difficult to handle," the enjoyment of ill-health on the part of those who have discovered what power they can wield when a sick headache silences footfalls, and the inverted snobbery of so many middle-class aspirants—all such phenomena becomes a little more intelligible to us in the light of Adler's formulation.

Whether the inferiority complex be sexual inferiority at bottom, and whether compensation be merely a secondary gain, the dynamics referred to by these two complementary notions are so important that they form an independent study of their own. In saying this, we must not blind our-

selves to the fact that the two theories often present mutual incompatible interpretation, and at such points one or both must be at fault, but, in general, it will be found that both schemes are useful : some forms of behaviour are more intelligible when viewed through Freudian glasses, and some slip into their place in the personality pattern we are studying, when we apply the Adlerian framework.

Sociological theories.—Not unlike the Adlerian thesis are those of a sociological type (*e.g.* Durkheim on " Suicide "). A great many sociologists view an individual's behaviour as a function of the social group to which he belongs. This way of looking at things is particularly important when we consider the problem of the opinions and beliefs which he holds (*cf.* p. 367), but it may be taken further than this. According to Durkheim (4), for instance, suicide may be due to the fact that the individual in question is not adequately accommodated to the social forces in which he is embedded, in fact, he is a " misfit."

Although no detailed theory of the way in which social incompatibility has been worked out, it is useful to have this aspect of the problem put before us. Undoubtedly the culture pattern in which we live determines to some extent the strains which will be put upon us, and if these culture patterns are determined by transpersonal forces (*e.g.* evolutionary, economic, etc.) we must expect those individuals who are not " in the swim " to suffer for it, and further that an alteration of the culture pattern will produce an alteration in the incidence of psychological abnormality.

Jung.—There are three ways in which the schools of unconscious motive interpretation can be treated. They may all be rejected, one may be accepted to the exclusion of the others, or they may all be accepted as convenient frameworks, each exhibiting in high relief some of the factors which determine behaviour.

If the last approach be made, the three theories we are examining can be represented as having the following relation one to another : the Adlerian scheme deals with one important factor—the inferiority of the individual, the

Freudian scheme presents the dynamic interactions of libidinous desire, destructive urge, and repressive forces as they occur in the lives of each of us, while the Jungian scheme displays the individual in a wider and more general setting.

When we move in the world of Freudian psychoanalysis, we look back over the life of the person whose symptoms we are trying to unravel, we see his desires thwarted here and there, clothing themselves in fantasy, and eventually clashing in open conflict with the forces of repression, and thus producing the symptoms. We look, that is to say, back into the past to find the cause of what is happening in the present.

Jung sees the present as pregnant with and indicating the future. Each individual strives towards completion, and the past is important, not so much because it has tied a knot here and there which has to be untied, not so much because it has made a scar (trauma) which has to be disclosed before it will heal, but rather because it has hindered part of the self from developing. The present symptom, the day-dream and the night-dream are not only determined by the past, but, if read aright, tell us what to expect in the future. They are to be interpreted as indicators, showing us the attempt of the unconscious to bring about a state of balance. The two sides of our nature, the extrovert and introvert orientations (*cf.* p. 60), ought to develop side by side ; we ought to have practical ability, with an understanding and acceptance of reality, and yet not be absorbed in outside affairs to the detriment of our inner lives ; like Goethe we should be capable of writing Faust and running a state. Most of us, however, are only half-baked. Either we are absorbed in business affairs, or sensuousness, or we are preoccupied with our ego-centric position and see everything from a too personal point of view. The side of our nature which is undeveloped clamours for expression, and, as Jung frequently expresses himself in the " Psychological Types," takes vengeance for its neglect by causing strange and unaccountable feelings in the conscious mind. The general principle is that the over-developed side of our nature resents the incursion of the other side and regards with apprehension

anything which is connected with it, or else the undeveloped side will suddenly make an incursion and, *e.g.*, cause the introverted-thinking philosopher to make an unsuitable match.

This means that Jung does not regard the symptom as being merely something to be got rid of, it bears a message, and a warning; the unconscious is saying: "I am undeveloped in this and that respect, and unless I get some kind of representation in consciousness, I shall upset the organism altogether." This means, further, that Jung's attitude towards the dream is different from that of Freud. For the latter the dream is useful because it can be used as a starting-point for free-association, and is a useful precipitation of the unconscious disturbance from which its nature can be discovered; for Jung, on the other hand, the dream is something more; in it he sees the unconscious warning the self what will happen unless something is done to make the development more all-round.

So far we have seen the symptom in a setting which involves the future as well as the past, but it is still an individual affair. Jung does not stop here. He is convinced that in some symbols which are used in dreams, and in some of the material which form the living fantasies of psychotics, he can descry elements which do not come from the life of the dreamer or the psychotic himself, but which come from the collective experiences of the race. He has therefore developed the hypothesis of a collective unconscious to which we all have access, and which often provides a clothing for those unsatisfied aspirations which are common to mankind.

The individual is thus a peak thrown up from the common substratum, and the life of the individual itself has to be interpreted by reference to a super-individual setting.

General Symbology.

This notion of a collective unconscious which contain in it archetypal material with which age-old desires can

clothe themselves does not carry us as far from Freudian thought as might be supposed.

It is remarkable that man is continually interested in the same motifs, such as the dying god, the eating of sacred flesh, or the youngest prince who wins the princess. The same stories in slightly different forms are to be found everywhere. It seems that we are not content to clothe our desires in private dream-form, we like to project them, and other people, who are victims of the same conflicts, enjoy contemplating the same projection. This is not the place to discuss the fascinating question of cultural dissemination, the problem of whether such precipitations of conflict were spontaneous in different places, or whether they were all started in one place and diffused throughout the world. Whichever theory we adopt, we see that they were satisfying to enormous numbers of people. What conflicts, what predicaments do they represent ? For the Jungian they have a cosmic meaning, for the Freudian they are attractive because they represent a private difficulty. The dying god is interpreted by Jung (5) as a projection of the intimation of immortality crucified in the limitation which mortal individual clothing puts upon it. For the Freudian he is the guilty son who, like us all, harbours hatred and death-wishes against the father (the original sin), and, instead of us all, pays the price by death of his (and our) wickedness, and thus saves us by a vicarious sacrifice.

One of the most interesting branches of psycho-analytic research is the application of psycho-analytic principles to folk-lore, mythology and literature.

The difference between the Freudian and Jungian attitude is this : for the Freudian the symptom and the myth are rather unpleasant necessities, while for the Jungian they are expressions of valuable non-rational aspirations. Both admit non-rational forces as the basis of existence, but for the Freudian it would be possible theoretically so to organise education, social life and therapeutics that we could live frictionless and reasonable lives, allowing due satisfaction to our desires and preventing the accumulation of repressed

material. The Jungian, on the other hand, pays greater respect to irrationality. According to him we shall always require mythology, religion, poetry, not because we are too stupid to arrange our lives without such ridiculous safety-valves, but because they express a part of our natures that cannot be satisfied in any other way.

Therapeutics.—We must now briefly consider the problem of cure. We have seen that according to psycho-analytic theory, whether Adlerian, Freudian or Jungian, our peculiarities are to be interpreted as being due to unconscious motivation, and attempts to restore a disturbed balance, of which they alone make us aware. When these peculiarities are tiresome to us and our fellows we want them removed, and since they are psycho-genic in origin, or at least can only be conceived of psychologically, we must tackle them by psychological means.

Suggestion.—One way of treating mental abnormality is to suggest it away. The theory of suggestion is discussed on page 195. Here we need only say that it is possible to place a person in a highly suggestible condition, in which he is likely to accept and "realise" ideas which he receives from us. When we find him suffering from a hysterical symptom we can very often remove it by suggesting that he should no longer have it.

The objection that is often made of this practice is that it removes the symptom, but does not attack its cause, and that therefore another symptom will be developed in place of the one which has been removed.

It must be noticed that hypnosis can be used in two ways in psycho-therapy. In the first place it may be used simply as a highly suggestible state in which suggestion against symptom will be received with effect, but secondly it may be used as a means of acquiring information which will be of value to the physician. The information thus acquired may be exploited by suggestive therapy, but not necessarily.

Freud.—There are two important factors in psycho-analytic therapy: (1) It has been found that sometimes

a symptom is closely associated with a particular event which cannot be remembered and round which hover unexpressed and unresolved emotions. If this event can be remembered, and the emotion given free play (*abreaction*), the symptom may disappear. This *cathartic* treatment does not go to the root of the matter, but may suffice. The circumstances of trench warfare were so extraordinary that they put a severe strain on any constitution, and a person, who might have "pulled through" an ordinary existence, was overtaxed and collapsed with "shell-shock." In such cases the "cathartic" method was frequently enough to set him right. (2) The more fundamental treatment involves a mixture of remembering past experiences by means of free association, and the establishment of an emotional relationship (the *transference*) with the analyst. The patient focusses on the analyst and because his focussing point remains steady and unmoved the patient's disturbed internal condition gives rise to an intense and changing personal relationship in the alteration of which, and in the emotions to which it gives rise, the patient eventually sees reflected the desires, fears, and antagonism which motivate him. When he realises what factors are operative he is in a position of control over them. The fantastic content of his fears is realised and he fears no more; this reduces his antagonism, and he is left with desires, which, now that he understands them and accepts them, are more easy to deal with.

How exactly the transference relationship works is exceedingly obscure. It is quite clear that we do alter our super-ego systems when we come "under the influence" of some one else, and the super-ego is the central feature of modern theories of psycho-analysis. The super-ego is aggressive because it represents the subject's own projected hatred, which is subsequently introjected. External objects, which arouse dangerous impulses in the "id," are apprehended as themselves dangerous, and this causes further aggressiveness on the part of the subject. Such is what Mr. Strachey (6) calls the "vicious circle" of the neurosis. The business of cure is to reduce the severity of the super-ego. This, Mr. Strachey

suggests, is achieved by the setting-up in analysis of an "auxiliary super-ego" which represents the analyst, and enables the patient to perceive the contrast between the *real* nature of the analyst and the emotionally coloured notion of the analyst conjured up by the impulses of the "id" which are focussed on him. In this situation the fantastic nature of the original super-ego's prohibitions become altered and "toned down."

Adler.—As we should expect the Adlerian therapy aims at undermining the false life-plan to which the unconscious inferiority attitude has given rise, and making the patient accept himself at his true value. He must be made to realise that he is chasing a will-o'-the-wisp, and that he need not try to inflate himself because he is quite big enough already. He has, in fact, to be given a sense of his own worth, and fitted into the social texture.

Jung.—For the Jungian, the problem is to find out what part of the patient is undeveloped, and give it a chance to express itself. Fantasy and imagination, so far from being regarded as mere substitute satisfactions and ways of escaping from reality, may be valuable and important aids in the curative process. A person who has grown "lop-sided" because he has concentrated too much on material operations may be encouraged to take up some form of artistic production in order to satisfy those urges which cannot find adequate satisfaction in the world of practical affairs.

(1) James. Principles of Psychology.
(2) Bair. Psychological Review, VIII, p. 474.
(3) Glover. British Journal of Psychology, XIII, p. 165.
(4) Durkheim. Le Suicide.
(5) Jung. The Psychology of the Unconscious.
(6) Strachey. International Journal of Psycho-Analysis, XV, p. 127.

The following works should be consulted :—

Freudian Theory.

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Introductory Lectures on Psychoanalysis.
New Introductory Lectures on Psychoanalysis.
Stephen. Psychoanalysis and Medicine.

Jungian Theory.

Jung. Psychology of the Unconscious.
Modern Man in Search of a Soul.
Psychological Types.

Adlerian Theory.

Adler. Individual Psychology.
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CHAPTER VIII.

PSYCHO-PATHOLOGY.

IN this chapter we give a brief descriptive account of the principal forms of mental abnormality. Examples of defective functioning in various special fields of behaviour and experience will be found elsewhere ; here we are concerned with more general derangements.

This list is not to be taken as complete, nor can we mention all the symptoms associated with each named variety of mental disease.

A. *Neuroses :*

(1) *Neurasthenia.*—Nervous exhaustion ; hypersensitivity to light and noise ; depression ; constant feeling of fatigue ; frequently associated with excessive masturbation, together with inhibitions against that practice.

(2) *Anxiety neurosis.*—Anxious expectation ; hypersensitivity ; hypochondria.

B. *Psychoneuroses :*

(1) *Conversion Hysteria.*—Various regions of anæsthesia, especially cutaneous and visual ; no neural disorder accounts for the inabilities to feel or see, which are therefore regarded as psycho-genic. In cutaneous anæsthesia, the area involved corresponds to the patient's *idea* of the parts of his body rather than the actual distribution of the nerves. Disorders of movement ; hysterical fits, in which the patient falls, but in such a way as to avoid hurting himself, frequently followed by a characteristic arching of the back ; rhythmic spasms or " tics " ; hysterical paralysis. Amnesia.

(2) *Anxiety hysteria.*—General apprehensiveness ; phobias, *e.g.* agora-phobia (fear of open spaces), claustrophobia (fear of confined spaces).

(3) *Obsessional neurosis.*—Obsessional thinking ; phobias ; irresistible impulses, *e.g.* arithmomania (obsessional counting) ; dipsomania, kleptomania, pyromania (impulsive setting-fire) ; anxiety if the impulsion is resisted ; obsessional doubts.

C. *Psychoses :*

(1) *Maniac-depressive insanity.*—Intermittent manifestation : (*a*) recurrent mania, (*b*) recurrent melancholia, (*c*) alternating mania and melancholia and normality. General instability :

(i) *Mania.*—Elation ; easily roused to emotional display ; uncontrolled activity ; incoherence of ideas ; grandiose delusions ; extravagant dressing-up.

(ii) *Melancholia.*—Paralysis of emotion ; lack of interest ; suicidal tendencies ; delusions, frequently of eternal damnation.

(2) *Paranoia.*—Systematised delusions. These may manifest themselves in a preoccupation with " wild, altruistic impersonal theories " (1) or systematic delusions concerned with the patient himself. The former variety of paranoiac is called " mattoid," the latter are classified according to the content of the delusion : *e.g.* persecuted, exalted, litigious, religious, amorous, jealous paranoiacs. Freud (2), in the case of a certain Dr. Schreber, interpreted his delusions on a basis of repressed homosexuality ; the love of the patient for a member of his own sex is projected outwards and then dealt with in various ways (1, p. 312).

(3) *Dementia praecox.*—Physical stigmata common ; withdrawal ; apathy : various disorders of conduct : catalepsy (automatic preservation of a position in which the limbs have been placed ; echopraxia, imitation of actions performed in front of him (*e.g.* " *echolalia,*" imitation of speech) ; negativism (doing the opposite of what is suggested) ; catatonia (standing " rigidly in the same position from morning till night " (Stoddart)) ; verbigeration (continuous repetition of a sentence).

(4) *Dementia paranoides.*—" A form of dementia præcox in which hallucinations and delusions, especially of hearing and of persecution, play the most important rôle " (Stoddart).

D. *Epilepsy :*

Marked physiological peculiarities, especially of the blood-supply ; sluggish mentality ; self-centred ; tendency to religiosity ; tendency to commit sexual offences ; convulsions preceded by the " aura " (visual hallucinations, auditory hallucinations).

E. *Toxic insanity :*

(1) *Acute confusional insanity :* analgesia (insensitivity to pain) over certain areas ; ignorance of surroundings ; disorders of perception and judgment ; loss of sense of reality of external objects ; perseveration.

(2) *Delirium tremens.*—Hallucinations ; imperception ; anxiety and fear ; violent action ; perseveration of activities habitual to the patient.

F. *Organic insanities :*

(1) *General paralysis.*—General deterioration of function ; failure of memory ; delusions of grandeur ; defective reasoning ; defective speech. This disease is associated with syphilitic infection.

G. *Idiocy and imbecility :*

Retarded mental development, divided into various grades according to their capacities ; frequently the " result of some disease or of injury to the child *in utero* or during the first few years of extra-uterine life " (Stoddart).

This account is necessarily incomplete, but it is convenient for students to have some idea of the more important forms of mental disease which are mentioned in psychological literature.

It must be borne in mind that not every patient, suffering from any given complaint exhibits all the symptoms which are found in connection with that complaint. This is not surprising, because each organism has a constitution, and has had experiences, peculiar to itself, and will therefore present its own specific variety of mental abnormality. It is therefore only after years of experience that sure diagnosis is possible.

Classification.—The classification adopted here has been taken from Stoddart's " Mind and Its Disorders " with

the exception of the placing of "neurasthenia" under "neuroses," while Stoddart, on ætiological grounds, lists it under "psychoneuroses."

The whole question of classification of mental disease is extremely difficult, because there are at least two points of view which can be taken: you may classify them on a descriptive basis, or on an ætiological basis. From a descriptive point of view you are, of course, interested in the appearance which the patient presents, and the kind of symptoms he manifests. The great cleavage will be between those who are still able to have adequate contact with reality and those (psychotic) who have lost their reality-sense. From a causative point of view you will be liable to distinguish between those patients whose disease is manifestly associated with some marked physiological peculiarity, lesion, or toxic condition, and those in whom the mental symptoms seem the most significant. These you will classify according to the theory of causation which seems the most helpful. It is this point of view that has led to the classification of non-psychotic patients into "neuroses" and "psychoneuroses," and to subdivisions of these classes. For these purposes the similarity of symptoms is not so important as the meaning the symptoms have for the patient; *e.g.* a phobia may mean one thing for one patient, and something else for another.

Theories of Mental Disease.

Physiological.—The presence of physiological modifications in practically all mental diseases, and the fact that in some cases (*e.g.* epilepsy, dementia præcox, general paralysis) physiological peculiarities bulk very large, together with the prevalent view that all behaviour is explicable in physiological terminology have given rise to the view that mental disease is due to physiological causes. This view is supported by the fact that the complaint is frequently modified by physiological treatment. In some cases physiological analysis has revealed specific bodily symptoms

associated with specific varieties, and a considerable amount of research is devoted to establishing such correlations. Concentration on bodily symptoms, however, is not satisfactory because it does not supply us with an adequate account of the detailed variety of mental symptoms which is found. A physiological theory may be put forward to account for "flight of ideas," but we still want to know why the ideas are now about one subject, now about another. The symptoms may be classified according to type, but their content is ignored.

There is therefore a growing opinion that psychological interpretation should supplement physiological investigation.

Before we turn to such theories we must mention the theory of Janet to account for hysterical symptoms. Cases of conversion hysteria present the appearance of a part of the functioning apparatus having become dissociated from the rest; this gives rise to the view that the healthy organism is made up of a number of capacities organised into a unity, and kept together by a certain expenditure of energy. When this energy is too small to withstand the shocks of life the result is liable to be "a form of mental depression characterised by restriction of the field of personal consciousness, and a tendency to dissociation and emancipation of the systems of ideas and functions that constitute personality."

Psychological interpretive theories.—Such theories attempt to find a meaning for the mental and behavioural symptoms manifested by patients. The symptoms are not taken merely as evidence that the organism has "gone to pieces," but they are taken as expressions of desires and interests which can be understood if only we could find the key. The most elaborate framework of interpretation is that put forward by the Freudian school of psycho-analysis, of which a brief account is given on pages 159 f. The neurotics and psychoneurotics are more accessible to this kind of investigation than psychotics, because they are still in touch with reality and can be cross-questioned. The psychotic is interpreted as having abandoned the attempt to cope with the real world, and taken refuge in a world of his own, for this reason they

frequently display in unrestrained form many of the impulses which have to be restricted by the normal man.

No one nowadays will deny the enormous value of this line of research in rendering mental abnormality intelligible, but perhaps the most important result of the investigations into the psychological processes of the abnormal is the flood of light that has been thrown on normal psychology. The border-line between the " normal " and the " abnormal " has been wiped away, and paranoiac traits can be recognised outside asylum walls.

(1) Stoddart. Mind and Its Disorders.
(2) Freud. Collected Papers, III, p. 390.

CHAPTER IX.

OTHER PEOPLE.

THE problem of the existence of other people is one that belongs to philosophy, but it is closely bound up with the question as to what factors are operative in making us have the awareness of other people, that we undoubtedly do have.

As usual it is almost impossible to avoid philosophical issues, but we must be clear on one point: any argument which we may use to justify our belief in the existence of other people must not be taken as a true account of the way in which we obtain that belief. Mill held that we conclude that other people have minds because they have bodies like ours and because " they exhibit the acts, and other outward signs, which in my own case I know by experience to be caused by feelings " (1). Here we have a clear statement of the argument from analogy. We are not primarily interested in the validity of the argument; but in the question: do we, as a matter of fact, come to know of the existence of other people by this means—by " concluding "? The arguments against it are that children behave as though they were behaving towards *people* at a very early age, and that in any case the data from which they could argue are not the data which would be required for the argument.

The appearance of other people is after all so different from the appearance which one actually has present of oneself, unless one spends a great deal of time before the mirror. If I argue that when I make a certain grimace, I am having a certain feeling, therefore when I perceive that grimace before me, the feeling is also there, I am caught in two ways: (1) the grimace I am making is not present to me (unless I am looking in the mirror) in the same way that the grimace

of the " other person " is, and (2) even if I look in the mirror, it is *my* feeling that I associate with the grimace and not anyone else's. The theory, then, that we *infer* the minds of other people by argument from analogy is not satisfactory.

The alternative is that we intuitively cognise other human bodies as animated. This explains nothing, of course, but makes our apprehension of other minds immediate, instead of mediate. It means that we do not have before us unanimate human bodies, then go through a process of analogical reasoning, and then apprehend them as animated ; their animation is " there "—they are seen as animated (2, p. 330).

We may still, however, ask : what sort of situations are significant in shaping our apprehension of other minds ? Because animation is not inferred, that does not mean that the child starts with the view of other people which he will have as he grows up. Some experiences may well be more important than others in the course of his development in this respect :

(1) It is suggested by Broad that (2, p. 322) certain pieces of behaviour and certain characteristics of behaviour are " natural expressions " of certain states of mind, and that therefore, when we perceive them, we perceive them *as* expressions of these states of mind, and not barely as sense-data. The presentation from occasion to occasion of such pieces of behaviour will help us see the world as peopled by other persons like ourselves.

(2) It may be that " natural expressions " are not only expressions of some kind of mentality but carry with them an indication of what state of mind they are expressions of. This qualitative stamp will be further impressed upon the presentation of a facial contortion by acquirement of meaning from situations in which an emotion is felt to be shared. If, as Professor Spencer (3, p. 91) suggests, two people experience fear in the presence of a thunderstorm, the look on the face of the one may come to mean " fear " to the other because of his own emotion.

(3) Signs of planfulness in the behaviour of an organism,

and particularly signs of the planful choice of symbols which is necessary for intelligible conversation are immediately apprehended as signs of mentality.

Stout points out that the mentality of others is brought to the fore in all situations in which the perceived organism facilitates, or hinders, or completes the satisfaction of our own desires. In fact it may be said that the chief occasions in which we develop our awareness of other people's minds occur during our social intercourse. It is suggested that our awareness of ourselves as ourselves and our awareness of other people come about at the same time, and, for all we know, this may be the case. We cannot have any idea of what the world looks like to the child, but its behaviour gives us the impression that so far from seeing unanimate objects moving about it which it " concludes " to be animated, it ensouls all that helps or hinders it in the satisfaction of its desires, and such occasions as we have enumerated, especially the last, serve not as causes of our apprehension of minds other than our own, but as situations which favour the elaboration of our ideas of other people, and the distinction between the inanimate and the animate.

We have insisted that co-operation and conflict are important factors in the development of our conception of other people's minds, and we see that our notion of what other people are like is largely determined by the way in which they fit in with our purposes, our interests, and our moral framework.

To begin with, we must realise that we apprehend a person, mind and all, as having a past and a future. When we see a person and perceive the body as operated by a mind, we do not *infer* that that mind-body has been somewhere before it crossed our perceptual field ; we perceive them *as* having had certain experiences and about to have others. The continuity of phenomena as experienced always slips through the network of language which we cast over it when we attempt to describe it, and this has been responsible for a great deal of confusion in the theory of perception, as we see in Chapter XII.

When we answer the question: what have you actually before you? we say: a person with a body like mine and a mind like mine, now seeing this, now seeing that, now feeling angry and now plotting revenge, and so we atomise with our nouns and verbs what has passed across our view; to describe we must analyse, and in analysing something seems to get left out; the beginning of our story is sharp and the end is sharp, the person is now here and now gone, but really when a person goes out of the room, even though there is no sense-data of them, they are, for a longer or a shorter time, continuing in the present behavioural world in some sense.

When the character on the stage goes out of the door, saying that she is going into the kitchen, and while she is there the villain is preparing a trap against her return, she certainly does not walk into the wings, so far as our behavioural world is concerned at the moment; she is in the non-existent kitchen, while he is preparing his trap, and on her return to the stage, she is perceived *as* having been in the kitchen, even though we may know on reflection that she has nipped down to the dressing-room to powder her face. The point is that the behavioural world stretches further than the elements which we can trace to present physical stimulation, and that this is particularly the case with our perception of other people.

Let us now return to our apprehension of other people's minds and what goes on in them. If they cross our paths we are apt to regard them as hostile throughout; if they help us they are seen as kindly throughout. If they change in official relation to us, and have an opportunity to harm us which they had not before, we think they have changed their characters, and credit them with hostile volitions, when before they had friendly ones. Here again, the object we apprehend is apprehended as having qualities which go beyond the evidence. So vulnerable are most of us, that the characteristic of hostility is planted in others with much greater ease than is the characteristic of friendliness. If some one is, for some reason or other, unpleasant to us,

he is apprehended as always harbouring hostility against us, and, in defiance of common sense, as continually plotting against our welfare; if he is pleasant to us, ten to one he is pretending. Some people in fact live in a world in which the persons, with whom they come in contact, are never thinking about anything, or any one, but them, and such people can only with difficulty be brought to realise that other people have interests, other friends and other enemies besides them themselves.

It is not only our conscious experiences which determine, in harmony with our thwarted or assisted wills, our apprehension of what other people are like: our unconscious desires and aspirations often clothe other people as if they were lay figures in a shop window, with qualities we should like them to possess, or ascribe to them sinfulness which really lurks in ourselves. We sometimes find that a person has a fantastic idea of what we are like, because he needs a projecting ground for unconscious factors to focus on, and we find ourselves unexpectedly graced with brilliance or damned with wickedness. And when two people are linked up by the sentiment of love, the qualities ascribed to the mind of the lovee are indefinitely variable and frequently remote from the truth.

It is because of unconscious factors at work that the course of a personal relationship may be troubled. Some gesture is a source of irritation, or because of some indefinite irritation a trivial subject may be turned into a battle-ground. Sometimes a conflict will flare up and plates will be thrown, sometimes there is an undercurrent of war which may centre round, say, the wireless or the opening of windows. A personal relationship is a unity like a society of two, it has a history and a basis of habit and convention, and develops into something which almost seems to get out of the control of the interacting parties.

From this we can see how difficult it is to get a satisfactory idea of another person. Clouds of subjective interest blur the view, and, worse still, we nearly always want to alter what we see. One of the hardest tasks that any human

being can perform is to accept another and know him accurately.

Another curious feature in human intercourse is the fact that we tend to behave towards other people in terms of the way in which they behave towards us. This is not, of course, universally true, but the phenomenon is common enough, and sufficiently important to deserve mention. If some one behaves towards us in such a way as to make us feel that he distrusts us, we may by that fact be influenced in the direction of giving him some cause for his suspicions. If a group of adolescents are treated like school children, they may soon come to behave as such. It has been suggested that this principle is of practical importance, in that if we behave towards other people in a fearless and friendly manner, they are less likely to harm us than if we take precautions against them; the trouble is that few of us have the courage to begin.

Communication.—In our dealings with other people, we usually make use of signs, which are conveyed by physical media—sound-waves and light-rays, but there seems good evidence for the suggestion that there is another way in which something happening in one mind may be conveyed to the mind of another person, without the aid of the usual physical apparatus.

Telepathy.—The establishment of telepathic communications is a difficult affair. To begin with there is always the possibility of cheating: a person goes out of the room, those in the room concentrate on an object, and the objective of their concentration is indicated by means of signs by a confederate in the room.

When cheating is ruled out there is a further possibility: unconscious movement. The so-called "willing game" lays itself open to this interpretation. A person goes out of the room, the "experimenter" is told to "will" him to touch an article of furniture when he returns. The "experimenter" asks the subject to hold his hand, and by means of unconscious jerks the subject is led to the article thought of. This is an instance of "idea-motor" action—the

tendency to perform a movement when we concentrate upon it. If this is the true interpretation, it implies a heightened sensitivity on the part of the subject.

The case of two men experimenting in Copenhagen is important here. They sat in opposite corners of a room and tried to "send" the content of their contemplation to one another. The experiment was fairly successful, but when they fixed up a system of amplifiers they discovered that even when they thought they were keeping their mouths perfectly still, they were unconsciously whispering all the time (4, p. 63).

This means that even the cases in which a hypnotised subject tastes in his mouth something which the hypnotiser puts into his own (*cf.* Experiments of Elliotson, 4, p. 76) without his knowing previously what the substance is going to be, are suspect: how do we know that the subject was not olfactorily hypersensitive?

The results of experiments in which the persons taking part are in the same or adjacent rooms are, therefore, always open to criticism, but even they take on a new complexion in the light of experiments in "distance" telepathy. In 1885 Janet and Gibert influenced an hysterical patient at a distance of 2 kms. under control conditions, and since then numerous experiments have been performed for the purpose of establishing this form of telepathy. This means, of course, that the experiments in "near" telepathy may really have been due to telepathic communication after all.

In recent times mathematical ingenuity has been brought to bear on the subject. Elaborate calculations are made of what the results "ought" to be on a basis of chance, and these are compared with the actual results obtained (5).

Triadic telepathy.—*E.g.* N. Gernot in St. Petersburg, looking into a crystal, sees the movements of a lady known to a "sitter" present, but not known to the "seer" (4, p. 143).

Reciprocal telepathy.—The sender of a message "sees" the "receiver" and the "receiver" sees the "sender." *E.g.* a young man tried to get in touch with a lady, and

" saw " correctly what she was doing; she also saw him appear before her (4, p. 133).

Here we have two phenomena which have been " explained " by telepathy, and we must raise the difficult problem of such " explanations."

If telepathy is established at all, it is established on a basis of experimental evidence, in which one person thinks of something, and another person, in a consciously induced state of receptivity, thinks of the same thing, or of something connected with it.

The first move from these conditions is the hypothesis that when a person has a " vision," a feeling of apprehension, or a " knowing " that something has happened, and when these experiences are confirmed by the discovery that something really has happened, the information is conveyed by the same mechanism as is involved in experimental telepathy. In such cases the " sender " need not be trying to " send," and the " receiver " is certainly not trying to " receive."

The next step is to suppose that information can be " sent " unconsciously to the unconscious of a second person from which it may be " sent " to a third person, or, alternatively, that a person can unconsciously receive information from the unconscious of some one else. This is a very convenient notion for the interpretation of mediumistic information, when it turns out to be correct. The argument, " I was not thinking about it at the time," ceases to be evidential for survival. The only difficulty is that we now have to explain how it is that the medium " taps " the right unconscious at the right moment, when the whole world of unconscious minds lays open to her. To explain this relations of " rapport " are invoked, and psychologists, who are anxious at all costs to avoid the " spiritistic " hypothesis, sometimes go so far as to assert that telepathy works better when the unconscious is involved. This may conceivably be the case, but telepathy, as established, is a conscious affair. Telepathy ceases to be a useful explanatory notion when it is twisted to fit any case which puzzles us.

Another important set of phenomena which concerns the intercourse between human beings is that which comes under the headings of " suggestion " and " hypnosis."

Suggestion.—The noun " suggestion " and the verb " to suggest " cover a heterogeneous collection of phenomena: a plank across a stream " suggests " falling into it, the idea of falling in acts by " suggestion " and makes us do so; the cure of the doctor is often said to be due to " suggestion " that I shall get better if I take his medicine, and the " suggestion " conveyed in the question: " where was the black cat sitting? " may make me give an answer which is false, because in the picture I have been looking at there was no black cat at all.

Let us attempt to disentangle some of the processes which we must suppose to account for these various happenings.

Association.—The first example in the list above is obviously a case of association, and does not call for special treatment here; it is unfortunate that we use the word " suggestion " in that connection at all.

Ideo-motor action.—When we imagine crooking a finger, we tend to crook it in actuality. It is alleged that " if a recording instrument is placed on a person's head, so that a graphic record of his head movements can be got, it is found that when, with his eyes closed, he merely thinks of his head moving to the right, the record shows that his head has actually made a slight movement in that direction " (6, p. 441). In the " willing game," a subject is sent out of the room while the persons in the room decide to think of an object, say on the mantelpiece, and then one of their number calls the subject in, and makes him hold on to some part of his person, so that the " thought " of which object has been chosen may be conveyed to his mind. The subject is frequently led to the right object by an unconscious response to the unconscious movements made by the guide, who has his mind concentrated on the object and its whereabouts.

The Rev. E. H. Sugden discovered that he could guess correctly which number from a row of numbers a person was thinking of, if he held the hand of that person and passed it

slowly over the row ; a slight tremor would betray the critical spot.

Similarly much of the phenomena which centres round the ouija board, the turning and tapping table, and the spelling glass is probably to be traced to such unconscious embodiments of thoughts in action.

According to some psychologists there is such an intimate connection between the thought of an action and its innervation that if no restrictive force is present, the action will follow the thought automatically. Indeed it has been held that the idea of a movement *is* a weak effect of innervation itself.

Coué and Baudouin formulated a theory of suggestion of this kind. Ideas, they said, tend to realise themselves. This does not only apply to action, but to any idea of any process, including the general idea of health itself. Of course the language is figurative ; ideas are not like seeds that blow into the mind and start realising themselves, but what they are insisting on is some kind of automatic following of realisation after the thought has been accepted.

Their theory, however, is not as simple as this. They draw a distinction between acceptation by the will and acceptation by the imagination. A convenient way of picturing the situation is this : a man may either be intent on some purpose, alert and active, or he may be dreamy, woolgathering and occupied with nothing in particular ; the former is the will-ful or volitional state, and the latter the imaginative state, and for certain purposes we have to imagine that processes which go on in these two states may conflict.

According to the Baudouin-Coué view, for an idea to be suggestively operative, it must be taken up by the imagination, and not by the will. Furthermore, if an idea has been taken up by the imagination, and if an opposing idea is then concentrated on by the attention-volitional side, the result will be an intensification of the action corresponding to the idea taken up by the imagination (Law of Reversed Effort).

They produce curious instances to illustrate this : a pith

ball on a thread can be made to swing by imagining that it will do so and " realising " the idea in slight movements of the hand ; but if I try to stop it moving by trying to will my hand to stay still, it swings the more.

For Baudouin, and we can see that there is some justification for the view, there is a close connection between the imaginative side and the " unconscious," and we sometimes hear of suggestion being a " successful appeal to the unconscious " (F. W. H. Myers).

This reminds us of the Freudian theory of a conflict between the conscious and wakeful personality and the unconscious forces, so that opposition between effortfully and consciously striving and ideas with unconscious and imaginative backing is not unfamiliar.

There is much to be said for the ideo-motor theory of suggestion in cases in which the idea which is " realised " is put into our heads by association : we see a plank across a stream, we picture ourselves falling in, and our steps falter. Need we for such a case appeal to unconscious motivation ?

But consider a case in which we suggest to ourselves that we cannot remember a name, and then find that it will not come to mind. Is this a mechanical inhibition, the realisation of the idea, or is there some other agency at work ? Here the mysterious " realisation " of the idea seems merely descriptive of what appears, and we know from other sources that forgetfulness may be due to the repression of unassimilable desires. It is plausible to suppose that on many occasions the idea which is realised (*i.e.* that we shall forget) is the manifestation of a repressive force which inhibits the name.

A far more serious question is presented when the suggestion does not come by association, nor bob up spontaneously as it were, but comes from some one else. This is the source of most instances which are dealt with under the heading of " suggestion " and that is why we are discussing the question in this chapter.

If a person makes a statement to us with confidence, and

if there is nothing in our system of beliefs which counteracts its acceptance, we shall probably accept it as true. So far we need not call upon any special factor.

If a person asks us a question about something which we have seen or heard, and if the question implies a certain state of affairs, our answer may be in accord with the state of affairs implied. This is a special instance of the availability of knowledge for problem solving (p. 388), and also a special instance of the creative element in remembering. The question before us may have a background of implication : *e.g.* " what was Mr. X wearing when you saw him in the street ? " implies that I did see him in the street ; supposing *de facto* that I did not see him, then my answering of the question depends on the availability of this piece of information, and the fact that the implication conflicts with it may render it inaccessible, and I may creatively remember the colour of Mr. X's clothes. Experiment shows that people differ in the extent to which they can be " led " in this respect.

When, however, we refer to the prestige of the person who tells us anything, or asks a " leading question," we are up against a difficult problem. McDougall believes that we have a " submissive " instinct, and according to him, " the impulse, the emotional conative tendency of this instinct, is the main conative factor at work in all instances of true suggestion " (7, p. 117).

We have already discussed (p. 15) whether we have a " submissive instinct " in the sense of having a tendency which is satisfied by the end of submission, and have suggested that we must distinguish between a tendency to seek a certain end, and a mode of response in this connection. While it is very dubious whether submission is ever a purpose which determines our behaviour, there can be no doubt that we adopt a submissive attitude on all sorts of occasions.

We are prone to accept without criticism the statements, and even the commands of imposing persons. People vary in the degree of their " suggestibility " in this sense. Some

are impressed by a show of learning and others by fine clothes and wealth.

We must, however, go further than this before we exhaust the phenomena of "suggestion." What about "faith in the doctor?" Here the submission is not a passing attitude, but a more lasting relationship. According to McDougall we presumably develop a submissive sentiment round the doctor, and what he orders is liable to come about because of this.

The Freudian psychologists, however, bring the phenomena of suggestion into line with libido theory: a "transference" relationship is established between the giver of the suggestion and the receiver of it.

The most remarkable feature of suggestion is the possibility that it may affect operations over which we have no conscious control. We may say that we can understand how it is that a powerful speaker may make us believe things that he tells us, and how we may even be made to do things at his command, but it is very odd that the suggestion that we shall recover from a disease can have any effect at all. And yet that seems less odd when we reflect that a doctor can give us an injection of salt and water, instead of morphia, and suggest that we shall sleep, and sleep we do. Coué claims to have influenced the course of pregnancy, and to have cured maladies due to a disorder of the blood-supply.

We can sometimes make long-distance suggestions work on ourselves when we determine to wake at a stated time, and find that we actually do so.

We have here instances of an effect on the autonomic nervous system, which remind us of the access which Yoga practicants are asserted to have to the same region. This gives a certain plausibility to the doctrines denominated "Higher Thought," which teach that we can improve ourselves by "right thinking." The claims of such schools are usually "unscientifically" expressed in language which many of us find repellant, but, besides the fact that a profoundly interesting question is raised as to why we do find such things unpalatable, we have to keep our eyes open for

any evidence from this quarter, if only that Higher Thought shall not steal a march on Humble Science.

Crowd psychology.—We have dealt with "crowd psychology" elsewhere, but we ought to mention that our liability of accept and "realise" a suggestion is increased when we are members of a crowd, and when our individual and critical faculties are momentarily submerged.

Hypnosis.—Another condition in which our suggestibility is raised is the "hypnoidal" or "hypnotic" state.

A special set of commands from a person who impresses us, or whom we are voluntarily prepared to obey, puts us in this very peculiar condition.

The condition of hypnosis varies in degrees of "depth," and whereas in "light hypnoidal" states the subject is aware of what is going on, in "deep hypnotic trance" he is in a condition resembling sleep, save for his obedience to the commands of the person who is hypnotising him.

Authorities differ on the subject of the relation between trance and sleep. According to some, *e.g.* Braid, Wundt, v. Krafft-Ebbing, the hypnotic trance is quite different from sleep; according to others, *e.g.* McDougall, Hirschlaff, the two conditions are practically identical.

The methods of induction vary. McDougall describes one as follows: "The usual procedure . . . is to ask the patient . . . to recline in an armchair or couch, to make himself as comfortable as possible, and to relax all his muscles. He is told that he will feel restful and sleepy, perhaps pass into sleep, and that he should think of some distant pleasant scene. For a short time, not exceeding one or two minutes at most, he is asked to gaze steadily at some small object held about a foot from his forehead, a little above the normal line of vision. . . . He is told that his muscles are relaxing more completely, that his limbs feel heavy, that his eyes are growing tired. Presently he is told that his eyes are now closing; and as by this time he is glad to be relieved of the slightly fatiguing strain, his eyes actually close. The operator continues to talk to him, quietly but firmly suggesting complete rest and relaxation.

. . . At the same time it is well to stroke the patient's limbs slightly from time to time, handle them gently to display and encourage complete relaxation" (7, p. 85).

Professor Alrutz has shown that, although it is possible to omit "passes," the passes themselves may, under certain circumstances be of great importance.

There are various stages through which a subject frequently passes: (1) a condition in which he cannot move his limbs when told that they are too heavy; (2) contraction of muscles; (3) the condition of "waxy plasticity," in which a limb can be set in any position and will "stay put."

In deep hypnosis, the accessibility of memories is enormously increased, and a person may be made to stab some one with an imaginary dagger, walk across an imaginary stream, behave as though he sees and hears what is not "there," and impersonate some one else.

A singular phenomenon is "negative hallucination." McDougall (7, p. 92) gives an interesting example: five postage stamps on a card were shown to a subject; he pointed to each of the stamps, and then was told that a certain pair would not be there when he looked again. When he sees the card again he points out three but denies the presence of the two, which he has been told are not there. When the stamps are shuffled, he still denies the presence of the same pair, even though they are in new positions. The importance of this lies in the fact that in some sense he must see the stamps in order to avoid them. This is explained by McDougall by saying that the subject has disintegrated into two "separately functioning parts."

Post-hypnotic suggestion.—When a person, in deep hypnotic trance, is told to execute an act when he wakes up, either when he sees a certain signal, or after a certain interval of time, he may not know what he has to do between his waking and his performance, but he will do it when the time comes, or when the signal is given. Again we have the impression of a dissociated part on the look-out for a sign, or even performing a calculation of time, and then

forcing the personality to perform the task it has been told to do.

Dr. Mitchell carried out an interesting series of experiments related in his "Medical Psychology and Psychic Research" in which he told subjects under hypnosis to make a cross on a piece of paper after a certain number of minutes: *e.g.* on June 24th, 1906, at 12.25 p.m. he gave the suggestion: "from now in 7,200 minutes." The subject was woken up; the time-interval reached to June 29th, 12.25 p.m. "The suggestion was fulfilled at the proper time" (8, p. 32). This means that the subjects had to do a complicated sum, and make an estimation of time, all without their knowing anything about it.

An interesting feature of post-hypnotic suggestion is that it frequently affords examples of rationalisation (*cf.* p. 404). When a subject is asked why he has, *e.g.*, opened his umbrella in a room, he will attempt to give a plausible reason for the act, though he may be unconscious of the cause.

This control over a subject's acts when he is in a trance, and the fact that he will obey commands post-hypnotically, together with the evidence that telepathic communication has been discovered to be possible between a doctor and a subject he has treated hypnotically, has led people to make exaggerated claims for the possibility of the use of hypnosis for criminal purposes. Happily there are limits to the extent to which the subject will respond to post-hypnotic suggestion, and to suggestion while in trance. It appears that if a suggestion meets inhibitive forces in the subject, it cannot reach fruition. It remains possible, however, for the whole personality to be altered by the relation between the subject and the hypnotiser, if the former becomes dependent on the latter and so habituated to obedience that hypnosis can even be induced at a flick of the finger. Such dependence involves the fixation of more than momentary interest on the person who gives the commands.

The next feature we must mention leads us into the realm of theory. When a hysterical patient suffers from amnesia,

hysterical blindness or hysterical paralysis, it is found that these symptoms can be removed by suggestion, and that under hypnosis what is functionally absent in waking life, becomes operative. The "appeal to the unconscious" theory sounds plausible. It looks as though we were getting at the root of the trouble in these cases when we come to grips with the hypnotic personality. For this reason hypnosis and suggestion without hypnosis are used therapeutically.

Now when we contemplate an hysterical symptom, it looks as though a part of the total personality had broken off and refused to function, although, so far as its physiological condition goes, it could function perfectly well. And when we contemplate hypnosis the same situation presents itself: is not the listening obedient trance personality split off from the rest of the personality, dissociating itself from all stimuli except the voice of the hypnotiser? The fact that hysterical people are easily hypnotised, and that their symptoms can be manipulated and imitated under hypnosis, has confirmed many psychologists in the view that the hypnotic trance is an induced hysteria, and that because of their liability to dissociation, only hysterics can be hypnotised.

According to Janet, hysteria is simply a breaking off of a function from the integrated organism, and for those who see organisms as collections of functions, *i.e.* a functioning nervous system which may or may not hold together, this view of hypnosis has its appeal.

McDougall and Freud, however, regard hysterical symptoms as purposive responses, and not the mere aimless revolving of wheels which have got disconnected.

Here we have the two views opposed, whose opposition we have noted so often. For the one party a human being is a machine responding to stimulus, for the other, what responds is something which you can call a purposive urge, desire, interest, personality, libido—any name which suggests something more than the bare nervous-system-in-a-situation, even though eventually the formulation of these "somethings" may be given in neural terms.

For the purposive psychologists the significant factor of hypnotism is the relation between the subject and the hypnotiser which, under these circumstances, is called " rapport." As mentioned above, McDougall believes that this relation is based upon the excitation of the " instinct of submission," while for Freud and his followers it is based on the symbolic part played by the hypnotiser in the unconscious mind of the subject.

For the Freudian theory it is only natural that the hypnotic trance should be closely associated with hysterical symptoms, because unconscious forces are operative in both cases.

In the light of such theories as these last, we should expect that anyone could be hypnotised, either because every one has a submissive tendency, or because every one has unconscious urges inside them which favour the setting up of the " rapport." This is borne out by investigation. Most people can resist hypnosis, but anyone can decide to be hypnotised. If a person fears that he will be hypnotised and struggles against it, he falls easy prey, because his emotional condition renders him the more open to suggestion.

There is one point which is usually not taken any notice of, but which, on any theory of hypnosis, remains so far incompletely explained, and that is the fact that a person can voluntarily submit himself to be hypnotised. If we automatically adopt the submissive attitude in the presence of the impressive personality, or if we are swept off our feet by the sudden focussing of our libido on to the personality of the hypnotiser, we could understand that strange results might follow, but some people who practise hypnotic therapy are not impressive, and they declare that their patients can co-operate with them. It is very singular that we can set going the springs of the " rapport " of our own accord, and that we can place ourselves in a position to abrogate our consciousness by submitting to hypnotic treatment.

(1) Mill. Examination of Sir W. Hamilton's Philosophy, Chap. XII.
(2) Broad. Mind and Its Place in Nature.
(3) Spencer. Our Knowledge of Other Minds.
(4) Baerwald. Die Intellectuelle Phänomene (Dessoir: Der Okkultismus in Urkunden, Part II).
(5) Rhine. Extra-Sensory Perception.
(6) Boring, Langfeld and Weld. Psychology.
(7) McDougall. An Outline of Abnormal Psychology.
(8) Mitchell. Medical Psychology and Psychical Research.

CHAPTER X.

THE SELF.

THE problem here is: " What do we mean by ' I ' ? " As usual we have to distinguish between two questions: (1) What have we before us ? (2) What must we suppose to be there in order to make our account of human behaviour satisfactory ? Just as we have to admit that, although we live in a world of tables and chairs, there may nevertheless be no such things " really," so we may have to admit that although there may be something about experience which makes us use the pronoun " I," nevertheless there need not on that account be any real persistent ego. We must not argue from the fact that " I have a toothache " is sometimes true, that therefore there is a thing called " I " and this thing " has " a painful sensation. Of course, it may be that there is a persistent self, but it may be that we can give a coherent account of human behaviour and human experience without hypothecating it.

Empirical self.—In experience there is a centralisation of several items round the " same self." I can hear something and see something and smell something at the same time, and the hearing and seeing and smelling all belong to the same " I." This central " I-ness " attends a great many of my total conscious states. Some psychologists have suggested that " I-ness " attends all my conscious states, but there do seem to be some states when we are absorbed in the objective content which is " before the mind." There are, again some psychologists who would go so far as to say that the mind is *made up* of the objects which common

sense would assert to be " before " it, and for them the " I-ness " of which we are sometimes, in fact nearly always, aware would simply be another object added to the sensory or imaginal contents which constitute the state of mind. This misses an important point. When we are aware of ourselves as being and seeing and desiring at the same time, the " I " part of the experience is not on a par with the sound and visual content, and it seems to have a different relation to them from the one it has to the " desirousness." The " I " seems to " do " the desiring, and have presented to it the visual and auditory material, to part of which it may direct its desires. The empirical self, the self of which we are aware at any given moment, is not adequately described by saying that it is something added to the objective content of the mind at that moment; it is a unique something, which appears as a central and relating point in an experience. It is important to remember that we are only calling attention to a characteristic of a great many experiences: *viz.* that there is an " I-ness " about them.

Besides being " aware of myself as experiencing such and such," I can " remember myself as experiencing such and such." Here " being the same self then as I am now " is what we might call the " mode " in which the kind of experience we call " remembering " occurs. Just as " I-ness " is a characteristic of many present experiences, so " my-ness " is characteristic of all memory experiences, and obviously I may often be aware of *myself* as remembering one of *my* past experiences. Here, again, we are merely calling attention to a characteristic of experience which is relevant to our purpose here, and not saying that the remembering experience and the remembered experience really belong to the same self, a thing that has persisted from the one to the other. It may be that in the case of true memories the simplest account is that the same thing " had " the experience when it occurred as is remembering it now, but not all psychologists hold such a view.

Even if we come to the conclusion that there is really no self which goes on from experience to experience, we

still have " I-ness " and " my-ness " to deal with when we are giving a full description of conscious life.

But besides the " I-ness " of the present and the " my-ness " of a remembered content a true description of experience should go further. When we speak of " an experience which is happening now " it sounds as though we lived in jerks. In some sense we experience this " I-ness " as being continuous. It gives a false impression of what conscious life is like to say that it is made up of a series of centralised experiences and leave it at that. I feel myself as persisting, just as I live in a behavioural world of houses and tables which persist when I am not there to see them. It is nonsense to say that I *infer* that because a house-appearance now is like my memory of it yesterday, therefore there must have been a house there all the time I was away ; no such inference need take place ; I simply live in a world with persistent furniture, and similarly I myself persist. Ten minutes ago I had a cup of tea. I can remember what it tasted like, and that it was " I " who drank it, but I do not *infer* that I must have persisted from the tea drinking to now ; I apprehend myself as persisting.

Again we remind ourselves that we are only looking about experience for such characteristics as have to be mentioned in connection with our problem of the empirical self ; because I apprehend myself as persisting, that does not mean that there is a self that persists.

For all that, any theory of the self has to account for these phenomena. The self is experienced as a persistent centre of present experience which has had experience in the past. Just as space is the framework in which visual data is presented, so myself might be thought of as the framework in which experience is presented, save for those rare cases where we seem to catch " ourselves " emerging from a state of absorbedness in a content which we immediately remember to have been such and such, in the awareness of which there does not seem to have been any " I-ness," but which we immediately apprehend as part of " our " lives.

Idea of self.—So far we have been concerned with what

might be called the "selfness of experience." From the apprehension of myself as persisting I can conceive of myself as a persistent thing, and from my memories I conceive this self of mine as having had certain experiences. I do not stop there. That is merely the basis of my idea of myself. I add material from the information I receive from others, and incorporate in my idea of myself much which I believe must have been part of my life-history. Such an idea is a common-sense abstraction from experience which every one possesses when not philosophising. It is the theoretical ego of everyday life, and any theory of the nature of the self must take account of the fact that among the items which make up a self, or belong to a self, there occur experiences of "having an idea of the self."

The theory of the self.—The reason why there is a doubt about the existence of a self as a thing which "has" experiences is, of course, that we can never track it down. When we introspect it is always "we" who are doing the introspecting, and we can never get, as it were, behind ourselves to see whether there is any self there or not. If the empirical self be regarded as the underlining of an element of the "I-ness" framework in which practically all experience is experienced, then introspection will fit into that framework, and we can never transcend it. This is not, as Broad points out, an argument against a persistent ego, because if there were such a thing, it would never be able to see itself because it would always have to be doing the seeing.

From the account given of the empirical ego it is obvious that any theoretical account of the self has to account for (1) present unity of several experienced items, (2) the apparent "belonging to the same self" of a series of items, and (3) the apprehension of self as persisting.

There are three alternatives: (A) We might hold that a mind is a collection of related mental happenings or mental things, and that the unity of the mind is *not* due to a special relation of "belonging to" which links all the happenings to a persistent self.

It has been suggested that the mind is made up of what we

should ordinarily think of as objects presented to it, and that there is nothing to be found in minds which is not found outside them. Broad (1, p. 581) points out that the things we have " in our minds " are not all on the same footing as the percepts and images, and that there are special relations joining, say a desire-feeling to the object of desire, which are peculiar to minds. It does seem paradoxical to suggest that there is nothing in the related items which make up a mind, which is not found elsewhere.

If we are going to make a " collection theory " of minds, we shall have to postulate some uniting relation. There will be special relations uniting the items of any moment, and special relations uniting the related items of one moment to the related items of another moment, which makes for a longitudinal unity of the mind. The appearance of continuous persisting might be accounted for by saying that the related items overlap or that any event of apprehending-a-persistent-self is caused by a set of unifying related particulars in accordance with rules yet to be determined.

James (2) has been more specific about these relations. He suggests that the " passing Thought . . . seems to be the Thinker " (2, p. 342). It has a trick of " immediately taking up the expiring thought and ' adopting ' it " (2, p. 339). This accounts for continuity, and " thoughts " are judged to be " mine " on a basis of the " warmth and intimacy " with which they come before the present thinker. This warmth and intimacy is based on resemblance, so that I feel to be " mine " ideas of the past which *de facto* resemble my present feeling. I am indebted to Dr. G. E. Moore for a criticism of this point of view : (1) we certainly admit to be " ours " experiences which " we must have had," but which do not come into the mind with any " warmth and intimacy at all," and (2) supposing a gun were fired off in the neighbourhood of two persons, it is likely that their feelings would resemble one another more than each feeling resembles " past experiences " which each remembers as " his," and yet the two experiences resultant on hearing the gun do not, on a basis of similarity, get mixed up with one another.

Similarity, then, does not account for the collection of experiences into " the same self," and it may be that if we want to escape from a pure ego who " has " the experiences, we shall have to invent a *sui generis* relation of " belonging-to-the-same-self " which holds between certain experiences and not between others, without there being a real " self " to which they belong.

(B) *Organismic theories.*—We have already met with the view that behaviour can only be understood if it is taken as the expression of a total organism. Parts of the organism, when examined in isolation, behave differently from the way in which they behave when the organism is acting as an integrated whole. The astonishing capacity the organism has of developing alternative modes of satisfying its needs when the usual methods are blocked, taken in conjunction with the demonstrable unspecificity of nerve substance, have persuaded a great many investigators that we have to start with the totality of the organism and interpret the actions and thoughts of the organism in the light of the demands of that totality. The uniqueness of the total self would then consist in the organic unity which makes the organism into an *organism* rather than a mere collection of anatomical items. Within the total organism subordinate systems might be discriminated, which were more or less integrated into the whole of which they are constituents, and Lewin suggests that " a special region, within the psychical totality, must be defined as the self in the narrower sense " (3, p. 61).

Koffka, too, develops a similar theory of the ego. Within the total organism there are certain happenings, mainly of a perceptual nature, which stand " over against " other happenings which are of an " ego-nature." We therefore have a primary distinction between the *ego system* and the *environment system*, the one standing in an important sense " over against " the other. The boundaries of these systems may vary, so that a hand may be incorporated into the ego system as " my " hand, and my clothes may be similarly integrated as part of me. The ego system is a developing

organisation, whose patternedness is to be regarded as involving relatedness in succession as well as relatedness in a simultaneous unity of organisation.

Whatever refinements may be introduced into the picture to account for the varying degrees of " centralisation " and " controlledness " which we can observe in the behaviour of human beings, the point is that the " self " is not something extra, added to the content of experiences and behaviour, but the way in which the organisation of the whole, or part of the whole, presents itself ; it is, in fact, the organisational aspect of the organism. On such a theory the " myness " of the past will have to be accounted for by means of traces which are integrated with the " ego system."

The *personalistic* theory of the Person is somewhat different from the organismic, but shares with it the denial of a separate conscious personality in the naïve sense. For Stern, the Person is an " end seeking totality " which must be conceived of as " psycho-physically neutral " (4, p. 98).

The last alternative is (C), to suppose the existence of a *pure ego*. Scientific parsimony induces us to get rid of the " self " as an extra factor if we possibly can, and to reformulate sentences in which " I " occurs in such a way that " I " disappears. Naïve psychology, however, still has many supporters. It cannot be denied that we shall continue to use the naïve framework for a long time yet for certain of the purposes of psychological exposition, and it may be that we shall never be able to do without it altogether.

Some psychologists go so far as to say that the self is actually apprehended ; Dr. Aveling writes as follows : " The Self . . . it may be maintained, is as such an immediate datum of awareness." It cannot be described in general terms, but it appears " each time it is experienced, as a bare totality acting in some way " (5, p. 169).

Multiple personality.—When making a decision between " collective theories " and " pure ego " theories we have to keep our eyes open for pathological cases which are relevant to our discussion, and we must not forget that important field of phenomena which is surveyed by those interested in

" psychic research." The pathological material which is important here is the phenomena termed " Multiple Personality."

Under this heading are listed a variety of unusual cases. They all have this in common : the same physiological appearance is presented to the outside world, now associated with one set of psychological happenings, and now with another, and the evidence makes us say that the one set is a different person, or belongs to a different person, or presents a different " personality " when we compare it with the other. The succeeding " personality " may or may not remember the life of the preceding " personality."

Celebrated instances of " multiple personality " may be classified under three headings :

(1) *Fugue.*—Cases in which a person forgets his identity and performs a series of more or less complicated acts, after the performance of which he may be restored to his primary identity once more. *E.g.* Ansel Bourne, who mounted a tram car on January 17th, 1887, in Providence, and came to himself on March 14th in a different place. During the interval he had wandered about America and finally set up a shop at Norristown, Pennsylvania, where he suddenly woke up as his old self. He had forgotten all the events of the fugue, but recovered the memory of them by means of hypnotic treatment.

(2) *Alternating personalities without co-consciousness.*—In these cases a personality with one set of interests and one temperament is succeeded by another personality with another set on interests and another temperament. *E.g.* Felida X, a melancholy and timid girl, who would suddenly wake up gay and smiling. The melancholy personality could not remember the events of the gay personality, but the gay personality could remember all the events of the melancholy personality as well as her own.

Occasionally all knowledge is wiped out as in the case of the Rev. T. Hanna, who was reduced to the state of a child by an accident. He quickly learnt a new set of skills and developed a new personality, which could not remember

any events prior to the accident. These memories were not, however, lost, and the old self made its appearance during treatment and the two selves were eventually knit together.

In the famous Beauchamp case we have the same thing: "Two personalities with mutual amnesia are welded into a more complete personality."

In all these cases we get the impression of each "personality" being an incomplete part of a larger whole. In the Beauchamp case, however, we come across a very puzzling feature. Under hypnosis there appeared a personality who claimed to be a distinct individual called "Sally." This brings us to:

(3) *Co-conscious personalities.*—The word "co-consciousness" is sometimes used to refer to an alleged mental state of groups of people, so coagulated together that individuation either is not yet present or has been reduced; the prefix "co-" in this case indicates increased "groupness" or "togetherness" of the members of the social unit referred to. In connection with our problem at the moment, the prefix indicates the alleged "side-by-sideness" of two or more series of mental occurrences, and the term is employed by Morton Prince to refer to cases in which he believes that one has to suppose that side by side with the conscious stream of mental life there are other mental occurrences of the same nature. The notion of mental events like conscious mental events, except that they are not part of the conscious stream, must be sharply differentiated from the notion of unconscious motivating forces.

"Sally" claimed to be aware of the experiences of the alternating personalities, and indeed criticised them. The same phenomenon was observed by Janet who unveiled two personalities associated with his patient "Léonie." One of them remarked of "Léonie": "That good woman is not I, she is too stupid."

At first sight we seem to be dealing with a quite new "personality" and this may possibly be the case, but in the case of another patient Janet was able to influence the "co-

conscious personality " to an extent that seems inconsistent with its being an independent individual.

The fact that hysterical symptoms can best be interpreted as cases of dissociation of function, renders it plausible that the same type of interpretation may hold for these cases as well, in which case we might adopt a collectivist theory to the effect that if a sufficiently large part of the organism were dissociated the parts involved might be of a complexity sufficient to form a personality pattern.

For further detail readers are referred to Dr. Mitchell's " Medical Psychology and Psychical Research," Chapters III, IV and V.

Survival.—The hypothesis that we persist after death does not necessarily involve the existence of a persisting self. It may be that the collection of mental items which is the self goes on having more items added to it, when the body, with which it had been associated, dies. This view is not likely to appeal to many people, because the plausibility of the theory that the mind is made up of a number of related mental happenings is largely due to the fact that we have an idea as to where the mental happenings " come from " : they are either caused by physiological stimulation or caused by memory-laws, and when the body has gone there seems to be, as it were, no prompting factor which will produce new events to add on to the ones prompted by the life in the body.

If we have come to the conclusion that mediumistic phenomena cannot all be explained without the hypothesis that discarnate mental happenings do occur, then we must distinguish between two directions in which the evidence points. In the first place we may take the evidence as pointing to a remembering of something, or we may take it as pointing to the intention of some one to communicate. Now supposing we were to go so far as to admit that memory-causality (association) could manifest itself without a body, then it might be that when a medium made a statement, which referred to some past event, the making of that statement might involve in its causality a mental happening

which was so related to a set of other mental happenings that it " belonged-to-the-same-mind " as they did. The view might be that when a body dies, mnemically-caused events continue to occur, so that persistence would mean " going on remembering."

If we add to this the evidence of " control " by a person known to a sitter, and if we assume that the altered gestures of the medium could not be caused by something going on in the " mind " of a sitter, or of any other live person, then we shall have to suppose that the further mnemically-caused events which " prolong " the self after the death of the body can cause physiological changes in a living body.

If, however, we concentrate on that aspect of the evidence which seems to indicate a desire to communicate, or an intention on the part of a discarnate mind, we are faced with a difficulty. A series of perceptions can be easily considered as a " mere " series, and the same is true of a series of images in a day-dream, but it is harder for us to look on a series of efforts which make up the " carrying out of an intention," as a mere series.

The most elaborate evidence of intention to communicate is dealt with under the title : " Cross correspondences." In these cases independent scripts of independent mediums are discovered to contain clues to some complicated joke or problem. If you take any one of the scripts by itself, it is not intelligible, but if you take them together they can be understood. The evidence is extremely complex, and the " correspondences " that are discovered are extremely subtle. In our present state of ignorance it is impossible to come to any conclusion on the subject. We do not know enough about telepathy to warrant the exclusion of telepathic communications as possible causes of " cross correspondences," nor are we in a position to assess the value of other indications of survival.

If we deny the telepathic interpretation, and say that at least one cause factor was a mental happening not attached to a body, we have to suppose that " intentional series " are to be found in personal prolongations as well as memory-

series. This brings us to the question : how are " intentional series " dealt with by " collection theories of the mind " even when the body is alive ? Supposing X contemplates a plot and gradually puts it into operation. At various times during, say, a month, a little is added towards the ultimate *dénouement*. The same intention is being carried out by the same person, X, who originally thought of it. Now there is bodily continuity between the various manifestations of the same intention realising itself and one cannot help feeling that the reason why it is possible, with an effort, to think of the various lists of intention manifestations, which are spread at intervals over the month, as being separate but uniquely related items, is because there is an underlying bodily unity there in the background all the time. If the body is no longer there, and if we have evidence of several things happening which are to be taken as various manifestations of an intention at work, now here and now there, the question is : is it plausible to say that these intention manifestations are related to one another and to the series which made up X in the same way that the members of that series were related to one another when X was alive ? or is it more plausible to say that a central factor persists which " has " this intention now, and " had " that intention when X was alive ?

(1) Broad. Mind and its Place in Nature.
(2) James. Principles of Psychology.
(3) Lewin. A Dynamic Theory of Personality.
(4) Stern. Allgemeine Psychologie.
(5) Aveling. British Journal of Psychology, XVI, p. 169.

CHAPTER XI.

THE FIELD OF CONSCIOUSNESS.

THE unit of what is "before the mind" at any moment is the total field of consciousness. This may contain related items which come under various classificatory headings: emotions, thoughts, images and percepts. From waking to sleeping the field is continuous. It is continuous during any given "now" in the sense that all the items are related into one unity of apprehension, and it is continuous through time in the sense that although we become interested in new things, new emotions surge up, and new objects come to our notice, we live through the gaps between these new presentations in a continuous fashion. Such a description is clumsy and inadequate, but a reflection on what experiencing is like will suffice to show what is meant.

It is sometimes said that consciousness varies in some kind of way, and that there are "deeper" or "higher" consciousnesses. Such expressions are very misleading. Sometimes it is meant that we are interested in other people's concerns more than in our own, as when it is said that we are "more conscious of" other people's "misfortunes," but *quâ* consciousness, there is only a difference in content and not a difference in mode of awareness. It is sometimes important for a writer to make value judgments about states of mind, and on such occasions he may use some applausive adjective of consciousness—"higher," "intenser," etc., when all he means is that the objects of which we are conscious at such times are more valuable than the objects we are conscious of at other times, or that the being conscious

of certain objects is, in itself, more valuable than the being conscious of other items.

But what about falling asleep, or going " under " when we are anæsthetised ? Here there does seem to be a dimension along which consciousness varies. It is true that the content changes, but there seems to be a difference between the change of content when we are fully awake, and the change of content when we are falling asleep. We might name the characteristic which varies in the latter case and is constant in the former, " vitality," and it is possible that just as consciousness increases in vitality as we wake up, so it might under unusual circumstances increase beyond the normal waking state in the same direction, and it may be that this happens in the cases of mystic trance.

To return to the continuity of normal waking consciousness. We must do justice to it by remembering that when we take a chunk out of it for discussion, we have to regard the ends of the pieces as merging into the rest of the total stream from which it has been abstracted.

When, however, we consider a " now " in consciousness, that is, *any* piece of consciousness, because experiencing carries its " now " value with it, we notice that there are at least two things we can do: we can either " analyse " the experience, *i.e.* enumerate the items that compose it, or we can consider its organisation from a special point of view.

When we " analyse " a piece of experience we are immediately up against a difficulty. To ordinary common sense a description of what is going on in his mind at any moment is perfectly simple, and we frequently give such descriptions. Words may fail us, but the fact that they are felt to be inadequate is proof that we have something we want to convey—otherwise the question of adequacy would not arise. In our description we may enumerate a number of different classes of things which may be " in " our minds at the same time. As we are driving along the road we may have an *emotionally* toned *image* of the person we are going to see, who is at the same time *thought* of as probably away for the week-end, and while this is

happening we are not completely unconscious of the hedges and road which stretch before us in the *perceptual* world.

But can all this happen at once ? The answer, I think, is " Yes," because the psychological " at once " is a duration which might cover a great many moments of a fast-moving chronometer-finger. It is quite clear that we can apprehend " at once " a succession of items, and equally clear that the members of the series could not be before the mind simultaneously. For all that, the expression " at once " is ambiguous, and so is the expression " an experience." An " experience " may be a rounded-off totality, whose unity is given by the relatedness of its parts among themselves, while we may use the same expression to mean a " now "-totality, pictured as chopped out of the continuous stream of conscious life. Similarly, some one may say that they had been for a walk round the garden, had noticed the beauty of the roses, the sound of the birds, and thought of the stupidity of our respect for hard work, and that all the time he was feeling guilty because he was not at his books. " But," we may object, " did all this happen at once ? " His answer might be " Yes," in the sense that it was all part of one unity—his walk round the garden, and " No," in the sense that at any given " now " or " specious present " only a selection of the items mentioned was before his mind.

This shows that time lived through is vastly different from time as marked out by chronometers. The " reality " of time as a dimension of the " geographical " world is a matter for the philosophers and physicists, but it is important for psychologists to see that " simultaneity in phenomenal description is something quite different from simultaneity in the physical world. We have seen that in experience our " now " is apprehended as a duration of time as we conceive it, and that a " now " is embedded in the setting in which it occurs, and contains implicitly as a background the whole " experience " which surrounds it.

Introspection.—This matter of time, however, is not the only difficulty ; there is worse to come. We have been

thinking of naïve, unphilosophical and unpsychological description. For the careful investigator, the question will immediately arise: how can I describe what is happening now, if, when I describe it, it has ceased to happen? Introspection, it has been said, is retrospection, and when we look in on ourselves, we are turning round to look at what has just gone. The instrument we use upsets the data we are trying to look at. This has led some psychologists to regard introspection as gravely suspect. Not only are we powerless to check anyone's introspection, because we cannot see what he sees, but it is alleged that introspection is inherently invalid. To answer this charge we have to make an appeal to common sense. The argument that we can be mistaken when we introspect will not serve as an argument against introspection, because if we cannot introspect at all we can never know that we make mistakes. The appeal to common sense consists in the assertion that experience simply shows that we can introspect. It seems ridiculous to say that when I tell some one that I have toothache, my introspection has so altered the field of consciousness that my information is valueless. Actually I can know that I have toothache, and notice what it feels like to have it, and if our theory of what is possible is such as to make it impossible for that to happen which we know does happen, we must be wrong in our theory. It is said that when we introspect an emotion, it evaporates. Theory would certainly lead us to expect that it is only when an emotion is on the wane that we are inclined to take a scientific interest in it, but we must remember that our whole intercourse with one another depends on our knowing what it feels like to be frightened, or angry or lustful, and we could not know such things unless we were able to introspect such states of mind.

There are at least two ways in which we introspect. In the first place we can catch sight of something as it leaves the mind because the "specious present" contains more than one item in succession, and the immediate past leaves an echo which lingers on into the present (immediate

memory), and in the second place we can be in a state of mind of knowing that we have a sensation (or emotion) at the same time that we are having it. It has been said that this introspective awareness is of the very essence of experience, and that introspection is simply a case in which rather more stress is laid on one aspect of what is always there. Such a view has the merit of giving a place to introspection, but there do seem to be cases in which we are so outward-turned that the knowing of what we are experiencing almost vanishes, if not quite.

Koffka (1) has put forward an interesting theory to account for the possibility of introspection. It must be premised that, according to the "Gestalt" psychological view, an experience has internal dynamic laws, and that these laws partly determine the succession of items which pass before the mind, or emerge into action. According to Koffka some of the changes in the content of awareness change that content entirely, but "some are in conformity with the inner laws of the wholes observed" and "if our attitude is such that it causes a change," in conformity with the inner laws, "then the product of our introspection will be, though not the original datum itself, but a development of it." He then asks how we can know that our attitude is the right one, and answers: "It makes a difference to these processes whether they are allowed to develop along their own lines or forced into an anomalous course. From this it follows that the result of an adequate attitude should *feel* different from the others" (1, p. 158).

Attention.—We said above that besides enumerating the contents of the field of consciousness, we could describe it from a certain point of view, and to this we must now turn. Sometimes one thing will stand out in the field and sometimes another; sometimes a series of images occupies us and the rest of what is happening fades away into the background; sometimes the voice of the person who is speaking to us at a party is heard clearly against the buzz of conversation and the clink of glasses; sometimes we are pondering over the solution of a problem and "see" the table before

us with " unseeing " eyes, and sometimes nothing particular stands out at all for any length of time, the wool we are gathering comes in wisps, now this idea and now that, now we notice a cow and now the spire of a church.

This question of the organisation of the conscious field is a question of the distribution of attention. Attention is not a searchlight that we shine now here and now there, it is a mode of organisation, and has two aspects : the attentional organisation of the " now " and the duration of attention, as we might have expected from what has just been said of experienced time. At any psychological " now," some items are liable to occupy the centre of the field of consciousness and others will be background to them. If the centralisation is very marked, we speak of " concentration of attention," while if we flit from one thing to another, and focus on nothing, and if the sequence has no internal relatedness, we have the other extreme to which no name has been allotted.

When we think of attention from the duration aspect, the same thing can be said : when one subject (not necessarily one item, but a series of related items) occupies us, we speak of concentration, and when we flit from one subject to another we are, as has been said, in the opposite state of mind.

There is, then, a series of degrees of organisation of attention from what might be called " decentration " at one end of the scale to " concentration " at the other. Besides this, the pattern, though always a unity, may vary in structure. The simple pattern has one central objective or subject-matter, and all the rest, of which we are conscious, is background to this, but the situation is often more complicated. If you are at a party, talking to a friend, you may want to hear what is being said next door, and the structure of the conscious field with respect to the two conversations might be represented pictorially by two lines crossing and re-crossing one another, first one coming to the top and then the other, but both always being present. In the same way we may think of a problem and carry on a conversation about something very different. Undeniably we are capable of

attending to more than one subject throughout a given duration, but our capacity to do this is limited, and the more our field is concentrated round one subject, the less clear is the other.

We can conveniently picture this by imagining that there is a limited amount of psychic energy, which can either be evenly spread or concentrated in one place at the expense of others. A great many experiments are performed to find out how many things we can do at once, and how the mind deals with several tasks which have to be done at the same time ; *e.g.* a subject may have to tap rhythmically while he does a mathematical calculation. As might be expected, if the tasks can be " integrated," *i.e.* so interwoven that a new single task is made by combining them, or if one task can be relegated " habit-wise " to the background, there is but little interference. If, however, there is serious incompatibility, *e.g.* writing one poem while reciting another, there is serious interference, only soluble by alternating the occupant of the attentional centre (2, p. 321).

When discussing attention with respect to physical stimuli, it is convenient to think of it as being a " set " of the mind, which allows or does not allow stimuli to make their presence known. In this way we shall be able to avoid muddles about " unconscious sensations " due to stimuli which were " there " but not " noticed." What will come into the field of consciousness as a result of stimulation is partly conditioned by the " set " of the mind at the moment, and this, again, is a function of a variety of factors, but is largely determined by the interests which happen to hold sway. Any stimulus has, so to speak, to compete for entry into consciousness, just as any impulse has to compete with the personality pattern for manifestation in action. It is therefore hardly surprising that there are a number of stimuli operating on our nerves to which it does not suit our purpose to " pay attention," and unless we have good evidence, we have no right to say that the " sensations " which we ordinarily connect with them were " there " unnoticed.

Much of what is called " adaptation " instances this. It

is true that when nerves have been stimulated for sometime by the same stimulus, the " sensation " occasionally fades on its own account, and it frequently happens that when a nerve is stimulated in one way the threshold to other stimulation is raised, but such phenomena, which are more like fatigue effects, should not be confused with our present subject. The clothes we are wearing, the seat on which we are sitting, the spectacles on our nose and our artificial teeth are not " noticed " because noticing them does not fit in with our interests ; they may come to be noticed if we turn our attention deliberately to them, or if they force themselves upon us by behaving oddly, or if the part they play in the total stimulus pattern is unusual because we are not " used to them."

Just as habits tend to unconsciousness, so repeated stimulation by the same stimuli tends not to arouse conscious response. A theoretical picture of nervous response may help us here : changes in nerve tissue are pictured as tending towards equilibrium ; every stimulus gives us a shove, so to speak, and conscious experience runs alongside of the agitation which ensues : we settle down with respect to some stimuli (and of these we are not aware), but others follow one another so swiftly that we cannot get settled to any one of them. To say, then, that because a stimulus does not make its mark in consciousness is not to say that it is not operating on us at all ; we are reacting to something else, and we are in equilibrium with respect to it. If, however, it is removed, we may well be conscious of a gap, as happens when we become aware that the clock has stopped ticking.

The same point is dealt with by Stern (3, p. 103), with his concept of " standing-out-ness " versus " embeddedness."

The organism has certain demands made on it by its own nature and by the environment, and a state of tension is therefore set up. If the organism has a method ready for coping with the situation, then nothing will " stand out " in consciousness, but if the organism has to face a situation containing elements to deal with which the organism has no

technique, then the attention of the organism will be centralised round the problem which has to be solved.

The acquirement of skills, adaptation to the familiar, and habit formation are instances of " embeddedness," the organism has " made its own " certain techniques of responding, while exploratory investigation, and the conscious application of past experience are instances of " standing-outness " ; the organism has to deal with the situation in the full light of conscious attention. All experience tends to become part of ourselves, to become " embedded " in our arsenal of techniques, and the degree to which we have to make conscious reference to experience is inversely proportional to the degree to which we have assimilated it, and made it our own. We progressively assimilate a foreign language, and have to " pay less and less attention " to the formation of the words, whereas at the outset the very position of our tongues may have occupied the centre of the attentional field.

Content of the attentional field.—What we attend to depends partly on ourselves and partly on the geographic world. When we determine to attend to something psychologists speak of " secondary attention," and when something forces itself upon us the expression " primary attention " is used. If the dynamic factors operative in us, both conscious and unconscious, are aroused to great activity, our conscious field will be structured round a central theme (ideal, imaginal, or perceptual), and stimuli which otherwise might make themselves felt will not do so, or will have a delayed action, or will merely add something to the background, or will add a faint secondary theme.

Conversely, when we are not so absorbed, stimuli will tend to attract our attention in proportion to their intensity or unusualness ; though a philosopher may leave one of his boots sticking in the mud without " noticing " it, most of us would be distracted by such an incident. The factor of habituation, too, may play a part : given a low degree of attentional organisation, any stimulus may distract us, but we may get " used " to high intensities of stimulation and be distracted by low ones.

We must not, however, look on the intensity of the stimulus as being the sole determining factor in deciding what will catch our eye. Our general interests, with the systems of ideas and memories with which they have been clothed, lie in wait to make our attentive eye quicker to be caught by one stimulus than by another. We have mentioned unusualness as a factor, and it is true that certain variations in the furniture of the world to which we are accustomed will be calculated to undermine our habitual disregard, even when they do not fit in with or thwart our momentary interests: five blackamores in top hats will probably catch the eye of anyone who happens to pass them in the street. Not every unusual stimulus, however, will draw our attention, particularly if it is a variant of a kind of stimulus in which we are not interested. From this it will be seen that our interests and habits dominate the scene, even though there may be certain stimuli (odd faces, loud sounds, bright colours, sudden touches, and soft footsteps in a lonely house) which have a universal attentional appeal.

Span of attention.—We have discussed the " span of attention " in everyday life, but we must mention laboratory experiments which are performed to discover how many items we can attend to at once under special conditions. The problem is a simple one: given a glimpse of a certain duration, how does the report of the subject as to what he has seen compare with what was presented to him? The answer is that " only about five separate impressions (points, lines, numbers or letters) can be counted after they have been momentarily seen. When short words, of three or four letters, are substituted, again only about five words can be apprehended " (2, p. 322). And with regard to taps of a metronome " it is found that when the taps succeed one another every quarter of a second, the subject can just apprehend groups of eight." Of course, as might be expected, the span of attention takes in more material if it is arranged in an order which renders it easily graspable, or when it is meaningful (*e.g.* sentences)..

Deflection of attention.—We have already referred to fluctuation of attention when mentioning the work that had been done on the number of tasks that can be performed at once. We frequently dart from one task to another and back again when we have two things to do " at the same time." Another important question is: can our attention be prevented from wandering? Under the ordinary circumstances of everyday life, the strength of the attentional organisation depends on the intrinsic interest which has been spontaneously aroused. " It is found," says Myers (2, 320), " that if a disturbance is either continuous or regularly intermittent, the subject soon adapts himself to it. When disturbance recurs with irregular interruptions, its effects are generally unfavourable." Here, again, it is as though the organism used consciousness as economically as possible, as though it had a technique for responding to the familiar, the rhythmic, and the regular in such a way as to leave consciousness free to cope with the strange and interesting. Such is the experience of us all when we are performing a task which is intrinsically interesting. When, however, we have a task which is not intrinsically interesting, or when an interesting task competes against a temptation, when, for example, we try to read while other people are listening to the wireless, we have to make an effort to keep the distracting influence at bay. In such cases we consciously reinforce the energies which are concerned with the task, by bringing in other energies concerned with self-regard, the desire to control oneself, the desire to finish a piece of work, etc. The organised system of tendencies which " lie behind " the purpose of the task automatically inhibit much that is incompatible with the performance of the task, the habitualising technique keeps from conscious representation much of the stimulus pattern to which our nerves are being subjected, but other desires (*e.g.* to listen to the wireless) may nevertheless compete, and a condition of conflict is set up. This condition makes for verbalisation: " I *will* concentrate on my book," and a feeling of effort and struggle. Training as well as constitutional

characteristics render one person better able to cut out the irrelevant than another. We have seen that one of the things that happen in development is that we become more integrated, and the ideal of integration would be that, when required, the whole personality should be organised about one theme, inhibiting all competitors, instead of being at the mercy of every stimulus which presents itself, and this is adumbrated in the difference between children and adults in this respect. Alain in his " Propos sur l'Education " insists that educationalists should give to this kind of self-control more attention than modern educational notions of pandering to childish changeability would indicate.

There is, besides this everyday problem, another interest attaching to attentional control. A refinement of concentration is to be found when the content of the field does not alter for an appreciable duration. If we contemplate a visual image it is very difficult to hold it before the mental eye for very long, and if we contemplate an idea, we soon start thinking " round " the idea, and have other images and ideas about the idea we started with. Now the psychologists who have taken mental exercises seriously report that if we practice concentration of attention, not only on one subject-matter, but on a single content, we are rewarded by changes in our personality of a far-reaching character. It is alleged that we achieve a certain feeling of control, and an attitude of acceptance which makes for composure. We are urged to choose for the content of the attentional field, when performing these exercises, the idea of a quality we should like to possess, either as exhibited in another or in itself. This contemplation of desirable characteristics may possibly have its effect through the same mechanism as is involved in " suggestion," whatever that mechanism may be. According to Pascal, if we contemplate loving Jesus long enough we shall end by loving Him. To those who are proficient in these exercises it seems as though the mind " becomes " the object it contemplates, and as though the consciousness of " I " is obliterated.

Oriental psychologists have practised and studied these matters to an extent entirely unknown in the West, and their studies have been carried on more or less independent of what is ordinarily known as religion. There is, indeed, no reason why mental exercises should be associated with any particular system of religious beliefs and practices, but it has happened that in the West, where most people are interested in material things, and where the notion of "exercise" is almost inseparable from the notion of "physical jerks," the only people who have taken the training of the mind seriously have been monks and nuns, and the information which we receive about it comes from the pens of such writers as St. Teresa and St. Ignatius Loyola.

There are, as might be expected, various degrees of absorption in these exercises, various methods are proposed, and various terms are used. Images from all the senses may be employed (*cf.* Ignatius Loyola), and a variety of qualities may be chosen as objectives of contemplation. Undoubtedly the mere performance of mental exercises is not sufficient to transform character ; practise of the desired qualities must supplement intention, and it is asserted by most writers on the subject that suppression of certain desires is a necessity, but it is probable that the people who have formulated the methods are desirous of inhibiting such desires for other reasons than as a preparation for meditation. On the face of it there seems no reason why, say, sexual gratification should interfere with the attainment of, say, kindness by the regular and systematic contemplation and practice of that quality.

We have treated this topic at some length, because it is almost always neglected by psychologists, and because psychology can no longer afford to neglect it.

We must now return to the field of attention.

It will be remembered that we started with the whole field of consciousness, and then considered that field from the structural point of view. The contents of the field are various, and include images and thoughts, as well as perceptions, but the greater part of the time we are occupied

in looking at, listening to, smelling, touching or tasting the world in which we behave, and therefore the field of attention is often the same as the field of perception. This will mean that the centre of the attentional field is often the same as the " straight-ahead " in the perceptual world, but it is not always so. We can attend to something seen out of the corner of the eye, and we can listen to a sound at our side without fixating it, in the canine sense of " pointing." It has been found, however, that if we attend to an area, other than the area visually fixated, there is a tendency for localisation to shift in the direction of the area attended to.

List of books referred to :

(1) Koffka. British Journal of Psychology, XV, p. 149.
(2) Myers. Textbook of Experimental Psychology.
(3) Stern. Allgemeine Psychologie.

Chapter XII.

THE PERCEPTUAL FIELD.

As I look out of the window I see a green field, a hedge, a telegraph pole, a cut hay-field, beyond which is a wood and on the top of a rise in the ground to the left is a newly-built house.

The first point to be made is that what I see are *things* with colour, and shapes and meanings and not patches of chroma which I subsequently discover to be fields, houses and woods.

The second point is that in a sense what I see points beyond itself. The fields and the house are seen as having been there before I actually perceived them now, and when I turn my eyes away, I turn them away from the things they were looking at, which still go on looking as they did. The world of perception is *phenomenally* a persistent world; that is one of its characteristics, and when we are dealing with the question, how can I justify by belief that the chairs in my room, when I am not there to perceive them, look just as they do when I am there to perceive them? we must not forget that we are dealing with a question of truth and not a question of experience. The "reality-feel," the "thinghood" of things, is a mode of our perceiving and not something which we rightly or wrongly infer.

Furthermore, our notion of existing is derived from our own feeling of being and from the "over-there-ness" of the things we perceive, so that if I say that something exists, I mean that it has being as I feel that I have being or that it is "there" in the same sense that the house and

the wood are there. This is an important consideration for those who wish to discuss the ontological status of sense-data and electrons.

The third point is that things are seen with an aura of meaning which clings round their purely sensuous bulk, and which involves that which is not at the moment (if ever) seen. The house on the hill is the " house which cannot be lived in because the electricity has not yet reached these parts." It " looks " empty and new, and my beliefs about the house fuse with and modify what I see, or what the house " looks " like.

The field of consciousness is a continuous field and the field of perception is an abstraction from it ; sensations are further abstractions of qualities which the things are perceived as " having," and which I can link up with hypothetical conditions of stimulation in my nervous system, caused by hypothetical physical stimuli in the shape of electro-magnetic disturbances or air-waves.

What analysis seems to force us to do, and what we must beware of, is to split up what is before us into separate parts and not to put them together again. If a house " looks " melancholy or forbidding, it is not true to say that we see a house and have a feeling of melancholy and leave it at that. The *cause* of the melancholy may be one thing, and we may invent an explanatory framework of " association of ideas " in order to account for it, and the *cause* of my seeing the house is another, but whatever cause-factors are at work, the melancholy-looking house must not be forgotten as a unit objective, immediate and not inferred.

Emptiness and gloom cannot be perceived sensuously, and yet the fact that we say that we " sense " them both, confirms us in insisting that the perceived thing cannot be reduced to sensuous bits ; to its make-up go our " senses," our past experience, our " thing-wise " mode of perceiving and our emotions. We must, in some sense, admit the " seeing " of what in another sense cannot be " seen." The man whose head I see over the hedge is perceived as riding a bicycle along the road, though no bicycle is visible, and I cannot

" see " the road. Sometimes, true, I infer: the man is moving his head in such and such a way, what is he doing? He must be riding a bicycle. But this need by no means always happen. I can perceive a head as " the head of a man riding a bicycle " immediately.

It is as though the representatives of physical stimuli that make themselves felt in consciousness were made to fit into a scheme of knowledge, likelihood, interest, expectation, memory and emotion.

" Colour and sound, hardness and warmth," says Stern (1, p. 219), " are not merely the sensuously given characteristics of things, they are the veils through which the meaningfulness of things presents itself to us."

And by way of insisting on the integrative character of all experience, so that one mode of experiencing gets entangled with another, Driesch remarks: " There is only one concept in normal psychology which is quite final: my ordered and ordering soul " (*Meine ganze ganzmachende Seele*), (2, p. 75).

Psychologists, who have approached the matter from the " sensation " aspect, have used such expressions as *primary meaning*, *acquired meaning* and *complication*. By " primary meaning " is meant the primary over-thereness of the presentation—in fact its very presentedness, while " acquired meaning " and " complication " refer to the aura of meaningfulness which sensations collect round them with experience. A sensation is conceived of as being received into the arms of memory, expectation and desire and clothed with meaningfulness by the " apperceptive mass " which is aroused to meet it. In this way we feel the coldness of the ice when we see it, feel the hardness of the armour, and have a foretaste of the savour of the food before we put it into our mouths.

Such expressions have their value. Our perceptual world varies as we grow in experience, and the " look " of a thing alters as it " acquires meaning " for us, but to speak of a sensation as acquiring meaning is misleading, because it implies that sensations are independent items, each attached

to certain physical stimuli ("constancy hypothesis"), whereas in fact they are laboratory abstractions, and the effect of a physical stimulus varies with the situation in which it plays a part.

If, then, we start, as we should, with the immediate perceptual field, we see that what we perceive is a function of our interests, our emotions and our past experience. When we are interested the words on the notice will stand out with their meaning in them; when we are interested in something else we may see the notice with words on it but we do not "read" them, and when we are gay the world looks gay to us, while gloom makes us look at the world with a "jaundiced eye." The recognition of persons, houses and so forth will sometimes be different for me from what it is to my friend because of our different experiences, and so we might go on emphasising the "subjective element" in perception. It would, however, be absurd to emphasise it too much. For the most part the stimuli and the general perceptual nature of mankind have the last word. We see much the same things in much the same way, in spite of important personal differences.

Space.—We are surrounded by an ambience in which we, and the objects we perceive, are. The ambience is apprehended as surrounding us, and in it, to the right or left, in front and behind, near and far are scattered things. The older psychologists made a problem of how visual space and tactual space fitted together. This is no longer a problem if we take space as the phenomenal mode of presentation for all my senses; it is "I" round whom space lies, not my eyes, my ears, and my finger-tips, and the space in which I hear is the same as the space in which I see.

Of course it takes experience to teach me to co-ordinate my eyes and my investigating fingers, and hemianopics, whose space contains less than the visual data that it would contain if both halves of their retinæ were functioning, have difficulties when they want to touch an object, but this is not because two spaces have come adrift, but because the movement-co-ordination of eye and muscle has broken down.

They have learnt to move their hands in a certain direction when they want to aim at something "straight-ahead," and this "straight-ahead" has been correlated with a certain area of stimulation in the eye (fovea); if the centre of clearest vision is now moved (pseudo-fovea) the visual "straight-ahead" is now no longer in the same geographical direction as the old straight ahead, and therefore they will reach out in the old foveal straight-ahead direction when they want to touch something in the new straight-ahead direction, and will miss it in consequence.

Visual space is articulated and centralised; it is, in Koffka's expression "anisotropic." From the point of view of a person staring "straight-ahead" there is the direction up-down, the direction behind-before, the direction right-left, and the system of rings far-near. Even when a person is faced with homogeneous stimulation so far as it can be procured, even when, that is to say, his eyes are uniformly stimulated, *e.g.* by a fog, the experience is not of a flat area no distance from him, but the fog is apprehended as being all round him, stretching away from him, and as being more condensed in the "straight-ahead" direction.

Our seeing of space has puzzled psychologists because of the dimensions of the retina. We can understand that right and left, up and down, are correlated with the spatial relations of the points of the retina stimulated, but even here a problem has been invented: the "picture" on the retina is upside down; how is it that we see things the right way up? This is really an expression of surprise rather than a serious question. It is true that if we were asked where the light-rays coming from the top of a house struck the retina, we should doubtless say that they fell on the top part of the retina, and in point of fact we should be wrong, because they fall on the lower part. All we want is to find a regular series of points on the retina which correspond in their relations to the relations of the regular series of points in the up-down direction, and it just happens that the series in the retina runs in an unexpected direction when we compare the position of the surface of the retina

with the frontal plane of vision. There is, of course, no absolute " up " and " down " ; we call " up " that which normally lies " headwards " and " down " that which normally lies " feetwards," and the confusion of thought when we make a problem of the " up-side-down-ness " of the " picture " on the retina is due to our muddling up areas of stimulation with the structure of the perceptual fields with which they are correlated.

An interesting experiment, performed by Stratten (3), revealed that if you wear glasses so constructed that light rays coming from the top of a house fall on the upper part of the retina, and those coming from the bottom fall on the lower part of the retina, the house does look upside-down, in fact the whole perceptual world looks upside down, and at first you are completely dis-oriented. Later on, however, you cease to notice anything odd, and learn to move without difficulty in the new perceptual world, and to swivel your eyes the right way when you want to look up or down.

The serious trouble is with depth. The retina is flat, and surely we " ought " to perceive a flat right-left, up-down surface no distance from us.

It used to be suggested that perception of depth was learnt by experience. At first we see a patch, presumably no distance from us, then we move towards it and it changes size, then we move back and the " same " patch now looks distant from us so many paces. This miracle was supposed to result from a mixture of movement " sensation " which gives meaning to visual " sensation," but it is difficult to see how any characteristic of our visual world so unique as depth could emerge from a mixture of coloured patches and muscular strain.

This " empirical " theory of space perception has given way to " nativistic " theories to the effect that depth is immediate and not derived from something different. We have already mentioned that if the retina is uniformly stimulated there is nevertheless a space-filling something *before* us, which is more concentrated towards the centre at which we are looking. Metzger (4) attempted to fulfil

the conditions of uniform stimulation by placing the subject in front of a wall which was reflecting light uniformly all over and filled the whole of visual space. He found that the third dimension was there, but unarticulated, and it was only when the lighting arrangements were such that the grain of the surface could be discriminated, *i.e.* such that the retina was heterogeneously stimulated—stimulation varying from spot to spot—that the wall was apprehended as such and such a distance " over there." This means that whereas tri-dimensionality is inherent in visual perception, you have to have certain conditions satisfied for it to be articulated. Heterogeneous stimulation is also necessary for stability of space. If, in a dark room, a spot of light is fixated there is a certain sense of insecurity either in the position of the spot itself or in the position of the observer.

The articulation of space and the position and dimensions of objects in it is connected with certain facts of binocular vision. Spatial relations are less surely and less accurately perceived by one eye. If you look with one eye at a vertical thread about two feet away, and if some one drops beads, sometimes in the district just behind the thread, and sometimes just in front of it, you will frequently make mistakes when you say which has been done, while if you look with both eyes, the accuracy is enormously increased. It is also claimed that the illusion of depth in a picture is much more obvious to binocular than to monocular vision.

If you fixate a spot some way away and two threads are fixed vertically upon a frame so that they can be moved from side to side, the apparatus can be arranged in such a way that one thread is seen by one eye and the other by the other. The two threads will both be seen at first, but if one of them is moved towards or away from the other, according to the original position, a position is reached in which only one thread is seen. The physical stimuli are then said to be operating on " *corresponding* " points of the retinæ. If the threads are now moved slightly apart, one will be seen *behind* the other, and then, with further distancing of the two threads, both will be seen again in the

same plane. The stereoscope is another instance of producing depth vision by stimulating just " *non-corresponding* " points of the retinæ, and our eyes are so placed that a considerable amount of stimulation thus affects them. We must bear in mind, however, that " the single images of certain objects arising from the correspondence of bi-retinal points, must always be accompanied by the double images of other objects, arising from the disparation of other points simultaneously excited " (5, p. 263).

The locus of the points from which rays will fall on corresponding points of the retinæ is called the *horopter.*

The following are other factors which play a part in the articulation of our visual space and the distancing of objects in it :

(1) The " real " size of objects. By the " real " size of objects we usually mean the size we apprehend when we are close up to them, and the grain of truth in the " empirical " theory of depth is that on the whole we correlated distance with objects looking smaller ; we have found that when we walk away from objects they grow smaller and smaller, and so when we see a large object looking small it tends to look a long way away.

(2) Distant objects appear to move across the line of vision slower than near objects when one moves one's head or when one is travelling in a moving object, and if you fixate an object in the foreground and move your head the distant objects appear to move in the same direction, while if you fixate a distant object and move your head the near objects appear to move in the opposite direction. This is due to the *binocular parallax*, the way distant objects affect the retinæ as compared with near objects.

(3) An object partially hidden by another object looks farther off (*e.g.* drawings of mountains).

(4) A distinct object looks nearer than an indistinct one, a fact which makes the estimation of distance dependent on atmospheric conditions.

(5) The shadows cast give an important indication of the relief relations of objects.

(6) For near vision we automatically increase the curvature of the lens (accommodation) and converge the eyes. When we converge for near vision and attend to a distant object it is seen as double, and the same is true when we fixate a distant object and attend to a near one.

(7) Colour. The cold colours look further off than the warm ones ; this may be due to variations in accommodation This fact is of the greatest importance to interior decorators who wish to control the apparent size of rooms.

(8) Under suitable circumstances, converging lines seem to vanish into the distance.

(9) When the illusion of distance is produced on a flat surface, as in a picture, or a line drawing, it is sometimes the case that the material of the picture, *i.e.* what it is a picture of, gives us a clue as to the depth relations, but this is not always the case. Koffka (6, p. 160) draws attention to line figures which could be seen as flat but which could also be seen as three-dimensional, and in fact frequently are so seen. Examples are the " ambiguous " drawing of a box or a truncated cone seen from the side. In the first case you might very well see a collection of lines in the same plane, but you do often see one set of lines as nearer than another, and in the second case you have two circles, one drawn inside the other and much smaller than it. Convergence and accommodation will not help us because the drawings are all in the same plane. Koffka suggests that we may have to fall back on some ultimate peculiarity of our optic sectors, in virtue of which an arrangement of forces which is correlated with tri-dimensionality is more stable than an arrangement which is correlated with flat vision, when we are stimulated by such arrangements of lines.

Localisation.—We have said that space is centralised round ourselves. It has a certain framework-like absoluteness against which variations in our own position are noted, and which co-operate with the body-position schema as a background against which our movements and position are measured. From a phenomenological point of view there

is an absolute " up " and " down," and a " right " and " wrong " way up, and we refer our own momentary position to this constant structure.

Alteration in our position is conveyed to our awareness by the variations in pressure of the liquid which fills the " semi-circular canals." Three half loops of hollow bone are set in our heads behind each ear, and the fluid which fills them is the same as the fluid which fills the central canal of the cochlea (p. 290). They are placed in three planes, one in the up-down plane, one in the side-to-side plane, and one in the front-back plane. They act like spirit levels, and varieties in the pressure of the liquid are connected with motor responses of a reflex character which keep us upright if possible. The sequence of variations in pressure combined with visual perception of space form a coherent pattern, by means of which we know which way up we are. If they are artificially disturbed, as happens when we revolve quickly, the pattern is blurred and the world seems to be going round when we stop, and a similar disturbance of space can be induced by alcohol. Further, if the semi-circular canals are hindered in their operation by something having gone wrong with our ears, we may not know which way up we are when there are no visual clues to help us, *e.g.* when deaf people dive under the water.

Again, our spatial scheme is sometimes upset when we are flying : the earth comes up to meet us when we land, and the world heaves over when we loop-the-loop. " It is said that aviators when emerging from a cloud sometimes discover that they are flying upside down by perceiving the sky below and the ground above them " (7, p. 229).

Under normal conditions, however, the world is still and we move in it, or sometimes our immediate surroundings are still and we move with respect to them, while, to the naïve vision, the outside world rushes by (*e.g.* in a train). It is worth noting in passing how remarkable it is that when our eyes are successively stimulated in a way guaranteed to induce the perception of a moving object, we usually are able to distinguish between cases where it is us that have moved

from cases where the object has " really " moved with respect to us.

When we look at an object with both eyes, it is located in a direction in space half-way between the two eyes (Cyclopean eye) ; there lies the binocular " straight-ahead," and if we close one eye and open the other and then close the other and open the one sufficiently quickly the object seems to flick fron side to side. Other objects are localised as occupying positions to the side of, in front, or behind the " straight-ahead."

This relatively stable structure of space has received attention from Head. Some of his patients had lost the power of indicating the place of their bodies in which they had been touched ; their spatial " schema " had gone wrong, and this oftens seems to happen to patients who suffer from speech defects. A celebrated experiment for the investigation of the adequacy of spatial schemata in such cases is to make the patient imitate on his own face, or on a diagram, the movements made by the experimenter. If they are both facing the same way, the patient may be able to imitate the experimenter's movements, *i.e.* he may be able to touch his left ear when the experimenter touches his own and so forth ; when, however, the patient is facing the experimenter, and then has to do what the experimenter is doing he may go wrong, because he has to imagine himself facing the same way as the experimenter, or he has to realise that he has to touch the opposite side of his face from the one which the experimenter is touching, so far as appearances go, and this may be beyond his capacities.

Auditory localisation.—The visual structure dominates auditory structure. In binaural hearing a stimulus may affect one ear in a different way from the way in which it affects the other: (*a*) The stimulus may reach one ear before the other ; this does not account for all localisation because both ears can be simultaneously stimulated and differences in localisation observed. (*b*) The disturbance at the two ears may be different in phase (the " crest " of the wave at one, the " trough " of the wave at the other) ; it is

not certain whether phase difference is responsible for variations in localisation, because such differences may possibly be reduced to differences in (*c*) intensity : the sound being localised to the side of the ear which is being the more intensely stimulated. (*d*) The pattern of stimulation in one ear may differ from the pattern in the other, because the head may modify the " partial tone components in the total stimulus pattern before it reaches one of the ears."

No one factor can be championed as the factor responsible for localisation at the expense of the others, and the interesting fact still remains that however the state of stimulation of one ear may differ from the state of stimulation of the other, there is a large area in which variation in the position of the source of sound will make no physiological difference whatever ; that is to say, that if we are standing a certain distance from a tree which is on our right, a vibrating object will have the same effect on our ears whether it be at the top, half-way down, or at the foot of the tree, so that although we may say that the sound is to the right on a basis of binaural difference, we cannot locate the source of sound accurately.

On these grounds Bannister insists that in practice experience guides us : we look up for birds and down for kittens. " Deer and other wild animals practically never look up into trees, and a dog brought up in the country, if spoken to when outside from an upper window, will not look up ; he will look in the right direction, but at his own level " (8, p. 298).

In this connection the experiences of P. T. Young (9) are interesting. He arranged ear trumpets in such a way that sound-waves coming from each side were conveyed to the opposite ears. The result was that he muddled up the direction from which sounds came, unless he *saw* the source ; if he did that, he localised the sound " belonging " to the seen object correctly.

In everyday life the source of sound really is on one side and not on another, but experimental investigation into the way in which binaural differences influence localisation is done by means of ear-phones, so arranged that one can vary

the stimulus provided by each ear-piece. This has revealed the fact that people vary with respect to the path a sound appears to take when moving from one side of the head to the other, when the differences in intensity, or phase, are being artificially produced. Sometimes it seems to move horizontally round the head, and sometimes it seems to move in a vertical plane.

Koffka (6, p. 221) tells us that accuracy of auditory localisation is influenced by the orientation of the subject with respect to the walls of the room in which he is sitting : if he is sitting " square " to the room, his accuracy is greater than if he were sitting slantwise.

Tactile and kinæsthetic localisation.—For the non-blind, space as seen dominates space as felt, but the ambience as explored by free movements and touch must be of an importance to the blind which seeing persons cannot imagine. For them there must be a division of space into " within reach " and " out of reach " which must dominate the structure of the field. The pattern " free movement—movement with touch—free movement again," populates their space with things, and the varying sequences of movement and its restriction by obstacles, the whole-wise grasping of objects and the exploring of their edges with the finger-tips must help to indicate the shapes of things and their relative position.

Touch is ambiguous, in that we can localise the touch upon our bodies and in space where the object is that touches us. Every part of our bodies has a special quality (or " local sign ") by virtue of which a touch here is different from a touch there, and by experience we learn that a touch of this kind is " head " and a touch of that kind is " toe." This power of localisation on the body may be disturbed, as happened with a man who had been wounded and who was unable to localise a touch on his body unless he moved.

When two points touch the skin, they have to be a certain distance apart before they are judged as " two " ; the acuity of awareness of apartness varies from place to place :

on the tip of the tongue two points need only be 1 mm. apart, while on the middle of the back they must be 68 mm. This variation in acuity influences our apprehension of the size of objects as judged by touch, and the sensitivity of the tongue is responsible for our feeling the hardly visible cavity in our tooth as a cavern.

There is also a muscular feeling of apartness, exemplified when we hold our index finger and thumb a certain distance from one another, and it is argued that our judgment of size by touch, a matter of paramount importance for the blind, is the result of our muscular sense of apartness which has acquired meaning by having been, as it were, measured off against our tactile sense of apartness when we have taken a part of our own bodies between our fingers, or moved our fingers up and down some surface of the skin.

With regard to smell and taste, there is little to be said. Smell is variously localised, sometimes in the nose, sometimes pervading an area, and sometimes in an object. Taste is always localised in the mouth.

Things.—Space is filled with things, or rather, has things scattered about in it. They are apprehended as persisting from the past into the future, and they are bounded and segregated from their environment and from other things. Their use-function, and various other factors which we shall mention presently, may join into one thing several bounded units (*e.g.* a lamp with shade and glass) and also join into one thing units which are visually separated (*e.g.* the sense-datum of a ship may be cut in half by an intervening object, but the two ends are apprehended as parts of the same ship).

From this and many more facts of visual perception, it is clear that if we analyse the visual field into disconnected patches with certain shapes, colour and size, we shall miss a very important fact: the appearances are joined together in relation of "belonging to" and "not belonging to," and the appearance of a patch may vary with the environment in which it is placed. The physical stimulus may remain unaltered, but the look of the thing may change if

you alter its surroundings. This is a fact with which we are all perfectly familiar. A short man looks the shorter beside his tall friend, our pictures look different against one wall-paper from the way they look against another, we alter one element in our dress and our whole appearance is altered, and so forth. The dependence of the look of a thing on its surroundings has been neglected in the past by psychologists, because they have separated out the items in the panorama before them, reduced them to their simplest qualities, and were more interested in the physiological conditions which were correlated with the simple qualities, and the stimuli which led to their perception, than in the mutual relations of the qualities among themselves.

In pursuit of this interest they abstracted the notions of pure colour, pure tone, etc., and then went into their laboratories and discovered what quantities of what stimuli were required to make a person have the sensation of, say, red, or hear, say, "middle C." They then assumed that they had tied the quantity of the stimulus round the neck of the "sensation" like a label, and that the same stimulus would always give the same sensation. This is the so-called "Constancy hypothesis" against which the "Gestalt" school rages. It is, indeed, demonstrably false, and it is the great merit of the Gestalt School of Koffka, Köhler and Wertheimer, the Leipzig school of Krüger and many other psychologists to have shown the mistake of the analytical method. Their books are full of experiments showing the influence of the background on the figure, of one shape on another, and so forth.

According to Koffka the optic sector of the nervous system is a totality with rules of organisation of its own. True, it is a sub-whole within the larger whole of the total nervous system, but it has sufficient independence for us to treat it separately. We have already seen what happens if you stimulate it in the same way all over, and how something different happens when you introduce inhomogeneity.

If you have a patch of stimulation surrounded by a patch of different stimulation you will be liable to see a figure on a

background, and the relations between them can be dynamically described in terms of forces inside the figure keeping it together which also makes for the segregation of the figure from the background, and the figure-background combination is one of the most important " Gestalten," or structures, with which the " Gestalt " psychologists deal.

Actually it is not true to say that mere inhomogeneity of stimulus is sufficient to produce a figure on a background. Liebemann discovered that " a coloured figure, say, a blue one, on a neutral ground, begins to lose sharpness and definition, and simplifies its shape, if it be intricate, when its luminosity approaches that of the ground on which it lies " (6, p. 126). There is also a familiar instance of the same point when a shadow is cast on a white card ; the shadow makes the card look darker in that area, but it

FIG. 1. (From Koffka's " Principles of Gestalt Psychology.")

does not constitute a figure on the white background. If, however, a line be drawn round the edge of the shadow a dark stain is seen on the background of the card.

In fact it looks as though a certain organisation were required for us to perceive figures, but when they are present any additional stimulus will behave differently according to whether it is apprehended as part of the figure or part of the background.

This is illustrated by an experiment described by Koffka (6, p. 136) : a grey patch is introduced into the side of a black triangle (Fig. 1, *a*), and another into a corner between the arms of a black cross, out of which the triangle was actually carved (Fig. 1, *b*). In the first case there is a great deal of white surrounding the grey patch, and in the second a great deal of black, and according to the rules of colour-contrast

(see p. 285) the grey patch ought to appear darker in the first instance than it does in the second. Actually the reverse is the case, because the grey patch in the black triangle belongs to it and therefore is segregated from the white background, while in the second case, in spite of the amount of black near it, it does not belong to the cross, and is therefore influenced by the white background on which it lies.

This raises a further and exceedingly puzzling problem. We may grant at once that a homogeneous patch, a blot or a disc, is a unit formation, and that it is segregated from the background and that its parts all belong to it, but what about the triangular patch in the corner between the arms of the cross ? It joins on to the black, but it does not " belong to it." Draw a triangle, paint it blue and put red spots on it and you have a red-spotted blue triangle ; put a spot at the side touching the triangle and you have a " triangle with a spot at the side " ; the spot does not *belong* to the triangle, it is a mistake, and may even pass unnoticed.

Privileged shapes.—According to Koffka and his school, there are certain shapes which, presumably because of the total distribution of the forces in the optic sector with which they are associated, are " good " shapes, and others which are less good. This sounds as though it were a mere judgment of preference, but of course that is not what is meant, and even if we do not agree with Koffka's interpretation, he has pointed out several important curiosities which are worth our attention.

The point is that shapes " behave " differently, and certain shapes stand out as being more " stable " or firm than others. As an instance of this we may take Hartmann's experiments (10), in which he displayed shapes which could be " taken " in more than one way, *e.g.* two white right-angled triangles, placed with their hypotenuses facing one another on a black background with some of the black showing between could either be taken as two triangles or as a white square with a black bar across it. In front of his figures he revolved a tachistoscope, a wheel

with a window in the brim, through which the figure could be seen. If the wheel revolves slowly the figure is seen twice; if fast, it is seen all the time; if between the two, the figure flickers. The question is: what is the critical speed for abolition of flicker? The answer is that it varies according to the way the figure is taken: the more stable the figure the lower the critical fusion rate (6, p. 184).

Instances of the domination of certain figures are constantly cropping up. Any three-sided figure is liable to look, not *itself* as it were, but a "badly-drawn triangle"; a twelve-cornered and not quite regular white polygon looks, at first glance, like a disk, and the field of perspective provides us with numerous examples of elipses looking like circles seen from an angle, and trapezes looking like square surfaces seen from the side. It looks as though the system of forces involved preferred to settle down in one way rather than another if they could possibly manage it, and as though, unless external stimulation were too much for them, they tried to pull the total state of stimulation into certain favoured directions. This view is backed up by the results of short-exposure experiments in which slightly distorted triangles or circles are seen as triangles and circles, and incomplete triangles and circles are seen to complete themselves.

If a circle be exposed to certain hemianopics, only one side of whose retinæ is functioning, he sees the whole circle, even though he is only "sensitive" to part of it, provided enough clue is given. Numbers of "completion" experiments are performed either with short-exposure, or exposure over the blind-spot, or exposure to hemianopics, and the general result is that completion takes place if sufficient clues be given, and if the figure "sensed" is not complete in itself (*e.g.* a hemisphere). It has been shown that completion is "real" in the case, for instance, of the hemianopics, because if you stimulate them with, say, a collection of dots that do not make up a stable figure, they will see the dots which are stimulating the part of the retina which is functioning, and not see those which are acting on the

part of the retina which is blind, but when the blind area is stimulated by part of a circle, the rest of which falls in the functioning area, they see a complete circle.

At first we are liable to say that this domination of certain figures is the result of experience. Of course experience plays a part. We see the words on a printed page, though the stimulation we get from it is fragmentary, we see a cartoon as a face and mentally fill in the eye or complete the outline, and, further, see the white surface "inside" the mentally completed boundary as more insistent than the "same" white which serves as background, and which is giving us the same physical stimulation. No one will deny that past experience is playing a part here, but Koffka points out that experience cannot carry the weight of the whole fabric of perception of form, because past experience must itself start somewhere. To say that we see a certain figure as a *triangle with an excrescence* at its side rather than as *itself*—an irregular figure—because we are "used" to triangles is nonsense; we do not see more triangles and circles than anything else, and to put their prestige down to past experience is to put the cart before the horse; we have picked them out as being distinguished in their own right because they have a prestige of their own. Of course their names "circle" and "triangle" are a matter of experience, but their importance is not.

The same counter-argument to the "empiristic" view, that experience alone accounts for all that cannot be put down to atomic sensations, applies when we consider the privileged status of the frontal-parallel orientation of the walls of a room. There is a "normal" or "proper" shape of a room, usually rectangular, and furniture is frequently disposed to fit the rectangular orientation. When we are sitting in it, and facing an angle, we are sitting obliquely to the room, and, in a sense, not "normal" to the shape of it; if we want to judge the true appearance of a wall, we stand in front of it, and because we have a natural preference for this particular view, it becomes the most frequent for us; it is not the "proper" way to look

at a wall because it is the most frequent, but it becomes the most frequent because it is " proper."

The great contribution of the " Gestalt " school in this connection is that they have pointed out that the " real " shape of a room, and the " natural " organisation of our space both call for explanation. We usually assume that the " real " world *is* what it looks like, and that we see it as we do because we see it correctly, but when we take our actual perceptions and examine them we find that the *standard* views of objects, rooms and space are only a selection of the numberless views which we actually have ; there must therefore be some so far undiscovered characteristic belonging to certain views (or, as Koffka would say, to the states of stimulation with which they are associated) which does not belong to others, and which gives them their privileged position.

The framework, too, may influence the " look " of objects seen within it. Wertheimer pointed out that a person looking into a tilted mirror through a tube at first sees the objects in the room behind him as tilted, but after a while the mirror world looks normal, and the stable framework wins, although what is really vertical is being reflected as oblique (6, p. 215).

Thouless (11), on the other hand, found that when his subjects looked at a tilted surface on which a lantern was projecting a picture, the surface looked " frontal-parallel " and the picture distorted—here the framework of the background triumphed at the expense of the picture within it.

Koffka (6, p. 218) reminds us how the carriage window of a mountain railway train is taken as horizontal, making the telegraph poles look tilted, though we " know " that the telegraph poles are vertical and the window-frame on a slant.

Lastly in Koffka's " Principles of Gestalt Psychology " (p. 185) will be found illustrations of some material used by Kopfermann which illustrate the influence of the framework on a figure within it.

Draw a square and round it draw a rectangle, both with their sides horizontal, and you will see a square on a rectangle (Fig. 2, *b*). Now draw another square in exactly the

same orientation, and a rectangle round it but lying oblique to the horizontal, so that the sides of the rectangle touch the corners of the square, and you will see a diamond on an obliquely placed rectangle, although from the point of view of their orientation on the paper the two squares are equivalent (Fig. 2, *a*). The same principle is illustrated in (Fig. 2, *c*, *d*).

We must now return to the perception of things. We have already called attention to the way in which parts of the visual field which belong to the same thing seem to belong to one another, and expressed in this way it looks as though this " belonging-together " were due to our perception of the thing as a separate entity. This is to a certain extent true, but

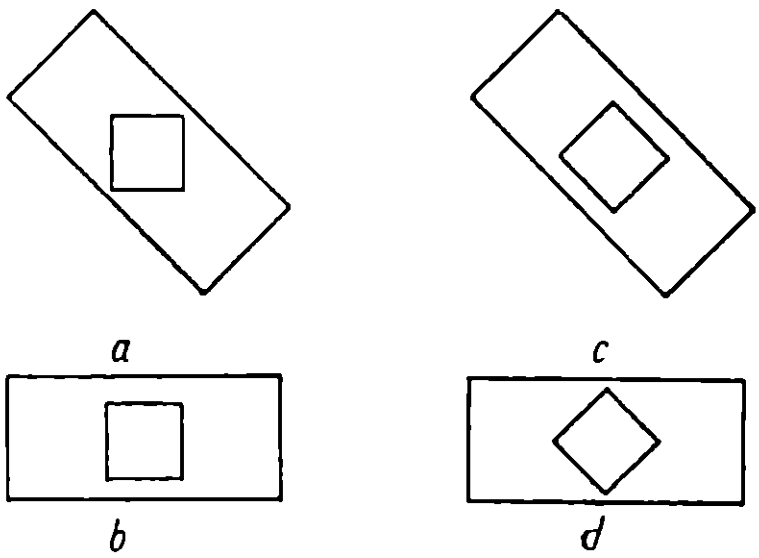

FIG. 2. (From Koffka's " Principles of Gestalt Psychology.")

we must bear in mind that for a thing to be apprehended as a thing it must first be segregated, that is to say, one of the pre-conditions for our carving the world out into things is the segregation of certain areas from their surroundings, and therefore to some extent we see things as we do because of the total stimulus conditions. The obliterating value of " camouflage " rests on this important fact.

The question, therefore, arises : are their any characteristics of stimulated areas which predispose the seen areas corresponding to them to appear to belong to one another, and are there any characteristics which make for the segregation of an area from a background ? We have already mentioned the factor of linear boundary as partly responsible

for our seeing a shadow as a thing, and the following principles have been formulated.

(*a*) *Proximity*.—Dots and lines close together " belong " in groups determined by the proximity of their constituents (Fig. 3).

O O   O O   O O   O O   O O

O O   O O   O O   O O   O O

FIG. 3.

(*b*) *Similarity of quality*.—If rows of stimuli with constituents of different sorts are given, there is a tendency towards the form in which the like ones appear grouped together (Fig. 4).

O O X X O O X X O O

O O X X O O X X O O

FIG. 4.

(*c*) *Closure*.—The boundaries of completely or partially enclosed areas belong together. Draw pairs of vertical lines, so that there is a small interval between the members of a pair and a larger interval between the pairs themselves and the members of the pairs with small intervals between them will " belong " together (" proximity ") ; now draw short horizontal lines from the top and bottom of the vertical lines and pointing towards the larger intervals, and the adjacent outer members of the original pairs will now " belong together " ; they will indicate the closure of an area. It is, of course, suggested by the " Gestalt " school that the new configuration is what it is because of the superior stability of the processes underlying the perception of closed figures (Fig. 5).

When a closed figure is drawn inside a larger closed figure, the latter tends to be " taken " as the background for the smaller one. This, Koffka points out, introduces the phenomenon of " double representation " : where the small figure lies, the occupied part of the larger figure is apprehended as

" there " but hidden by the figure lying on it. A problem here awaits solution : what are the conditions which produce the impression of a figure drawn on a background and not two figures side by side, or a figure with a hole in it ?

Draw a rectangle and a diamond " on it " so that the points of the diamond touch the sides of the rectangle. Why do we see a diamond on a rectangle and not two pentagons with their points touching ? (Fig. 6). Draw a circle " on " a

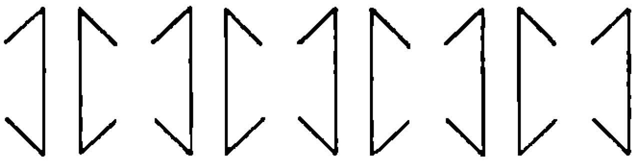

FIG. 5.

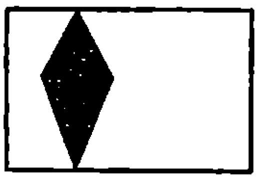

FIG. 6.

(From Koffka's " Principles of Gestalt Psychology.")

rectangle. Do you see a disk on a rectangular background, or a hole through the rectangle ?

The last example is ambiguous, *i.e.* might be " taken " in two ways, and the problem of ambiguous figure-background combinations is of the greatest interest :

(1) If a circle be divided into alternate and equal black and white sectors, four of each, and if a black (or a white) sector is presented as vertical to our line of vision, then a black (or white) cross is seen on a white (or black) background. Whether we see the one or the other depends on its favoured position.

(2) If the white sectors are equal but smaller than the black, a white cross will tend to be seen immediately on a black background whatever the position of the arms.

(3) Enclosed areas tend to be seen " upon " enclosing areas. Rubin, an important authority on this subject, points out that a contour segregates what lies inside it from what lies outside it, but does not *shape* what lies outside it. The contours of objects on the sky-line enclose the shape of the objects, they do not give the shape of the fretted edge of the sky.

(4) Those parts which have greater internal articulation will, *ceteris paribus*, become figures. " A good example of

this law are the sea charts on which, contrary to ordinary maps, practically all the detail is on the sea and not on the lands, with the result that now the seas become the figures, the lands grounds, and thereby look perfectly strange to us " (6, p. 194).

What, it may be asked, is the point of this jumble of " principles " and description of curiosities ? The answer is that we are left somewhat in the air. The approach of the " Gestalt " school is relatively new, and it is difficult to see whither it leads. All we can attempt to do is to see why it is important. The position is this : we are used to seeing things against a background of sky and they look so obvious that we never pause to ask why we see them thus rather than any other way. Why, it has been asked, do we see things and not the holes between them ? There must, it is argued, be something in the appearances themselves which makes for " figure-background " perception. Another " principle " enunciated by Wertheimer, may help to emphasise the nature of the " Gestalt " approach. When we see a thing move it moves " all of a piece," and we are not surprised because we have already taken it as a thing, but we forget that it is partly because it moves " all of a piece " that we take it as a thing at all. This is one of the instances of Wertheimer's " principle " of " common destiny " to the effect that if items are all affected by a " common destiny," *e.g.* all change their position in the same direction and at the same rate they tend to be taken as belonging together.

When we turn to " ambiguous figures " which can be " taken " sometimes one way and sometimes another, we see that there is a problem to be investigated, and that is why ambiguous figures bulk so large in the writings of the " Gestalt " school.

Having realised that there are problems to be solved, where uninquiring observations saw none, they took to examining simple line drawings to see whether, when we get away from " real " objects, there is any organisation about what we see, or whether there is a mere jumble of

lines. We then find, familiar enough but now presenting a problem, that lines enclosing and not enclosing areas seem to organise themselves into patterns, and now we realise that we have turned the theory of perception upside-down. It cannot be because of our experience with outside things that we see the patterns we do see, it must be because of some principles inherent in the conditions of stimulation themselves, and therefore, it must be because of the same principles that we see the objects in the behavioural world as we do see them.

Thus we are prepared for Koffka's suggestion that the reasons why we see the things and not the holes between them are: (1) more highly articulated areas "will become figure, the rest fusing together to form the ground," and (2) "the things which we see have a 'better' shape, are bounded by better contours than those which we might see but do not" (6, p. 209).

Two critical points must be mentioned, which will reappear when we give the outlines of the most important perceptual theories:

(1) The *immediate* appearance of an ambiguous figure may depend on the disposition of the excited areas as they respond to stimulation and interact among themselves, but by changing his attitude the observer can alter them "at will."

(2) While insisting that the main structural outline of the visual field may have to be accounted for in terms of the dynamics of adjacent excited areas, *i.e.* that in the main we see the world as we do because the forces operating on us are what they are, and because the stimulated areas of our optic sectors are obeying their own internal laws of balance, we are not denying that "past experience" plays an important part. We are made so that we see things in a certain kind of way, we then have experiences in connection with things seen thus, and as we grow up, the world, structurated as it must be in accordance with our perceptual mechanisms, will look as it does in detail because of our experiences in it.

We have concentrated on the importance of figure-background in the field of vision, but a moment's reflection will show that there are figures in other sense-fields: a tune is a figure, a rhythm is a figure, a rhythmic movement is a figure, and so forth, and just as we have seen that visual figures present a certain resistance to being broken up, so we find that we can introduce several "irrelevant" notes into a tune and yet the unity of the tune will be preserved; we can ornament a rhythm by introducing accentuations which do not exactly fit it, without changing the rhythm itself, and we can similarly complicate a kinæsthetic pattern.

"*Preperception.*"—Besides the influence of the past as a determining factor on present perception, the present expectations must also be mentioned. A person who is looking for something is thereby rendered more likely to see it, and even have an illusion that he is seeing what he is looking for. Numerous experiments have been performed on this problem of which the following is an instance: Kosog showed a 6½-year-old child a white paper on which a black dot had been drawn, then he told him to retreat until the dot was no longer visible, and approach until he could see it again. After several experiments of this nature he secretly replaced the paper with the dot on it by one which had no dot on it at all, and the child "saw" the dot at about the same distance as that from which he had seen it when it was really there (1, p. 136).

Such an example is also an instance of hallucination, but one can think of many instances in which preparation to see a drawing "as" a drawing of something will increase the probability that one will actually see it with the suggested interpretation upon it.

Constancy.—If we calculate the stimuli operating upon us when we see, and think of them as projecting images on our retinæ, we should expect that with change in the stimulus and the image we ought to have corresponding changes in what we perceive.

This is, however, by no means always the case, and we are about to consider a class of phenomena in which changes

in perception do not march hand in hand with changes in stimulus :

(*a*) *Constancy of framework.*—We have already called attention to the fact that whatever our position, lying or standing, the general spatial framework remains constant so far as it possibly can.

(*b*) *Size.*—Within certain ranges the change in apparent size does not follow the change in size of the area of the retina stimulated (the so-called retinal image). Within a near range a " retinal image " may shrink to half its size without a change in the perceived size. A man who is walking away from us looks the same size far longer than correspondence between perception and retinal image would permit. This is not only true of familiar objects, experiments have been performed on the constancy of size of disks and boxes. In an experiment performed by Beryl (12) the subjects had to choose a size corresponding to the apparent size of a standard object as it was seen at different distances, and for a cubic box, 7 cm. high, there was absolute constancy for 1 to 11 metres.

When a thread is seen through a hole and moved towards or away from the observer, the thread does not swell and contract with the " retinal image," it keeps its size and moves. Similarly if an iris diaphragm is opened and shut the circle of light does not always expand and contract, but frequently it retains its size and moves. If the size is seen to be constant the retinal difference is seen as difference in distance. It is found that constancy is greater in the horizontal plane than in the vertical plane.

Shape.—We are so familiar with this that we hardly realise its peculiarity. A penny seen sideways produces an elliptical " image " on the retina, but it keeps its shape constant. There is, as it were a privileged shape, and when the " retinal image " deviates from it, there is a tendency for the shape to be preserved if possible. The privileged shape is the one given in the frontal-parallel orientation. Of course it is not suggested that the constancy is absolute ; if it were we should not be able to differentiate between a

square seen in a frontal-parallel plane and a square seen sideways-on, but the actual shape seen is more like a square than would be expected from the retinal image (Thouless: " phenomenal regression to the real object "), and it is seen as a square obliquely presented. Squareness persists, " transforming " the phenomenal shape, and the change in the " retinal image " is seen as change in orientation.

Colour.—In spite of varying amounts of light coming into the eye, the chromatic colours retain their hues to an unexpected degree. Katz quotes an experiment of Hering in which he looked through a tube at a piece of blue paper illuminated by yellow light: it looked, as might be expected, neither yellow nor blue because of the complementary relation between those two colours (*cf.* p. 283), but when he looked at the blue paper in yellow illumination and not through a tube, it looked blue. This raises an important point. We shall later distinguish " film colours " from " surface colours " (*cf.* p. 279), and here it is sufficient to say that a surface colour, which seems to lie along an object under normal circumstances, will appear as a film colour, *i.e.* not localised on the surface of an object, when viewed through a tube or a hole in a screen in such a way that the colour fills the aperture, and provided that the surface value is not preserved on account of the perceived microstructure (*e.g.* grain) of the substance from which light is being reflected. The process of turning a surface colour into a " film " colour is called " reduction." On the whole film colours behave in accord with variations in the stimulus, but surface colours behave differently. This does not mean that we see them as exactly the same when the illumination is changed, but just as variations in the shape of the " image " on the retina find their counterpart in variations in orientation while constancy of shape is preserved, so variations in the response made to a surface chromatically illuminated reveal themselves in the apprehension of a colour, which keeps its constancy within certain limits, seen as *illuminated by a certain illumination :*

the illumination being, according to Katz (13), a phenomenological fact, whether it be normal or abnormal.

Of course, under certain conditions which are difficult to formulate, but which are familiar to all who have observed the changing glories which can be produced by skilful theatrical lighting, the illuminated colours do not preserve their hues. All one can say is that the surface colours do not vary in step with variations in the stimulus.

Even more startling are the effects when we see a white disk in the shade, or a black disk brilliantly illuminated. The white disk looks " white but in the shadow," the black disk looks " black but in the light." Here again the illumination is perceived as varying, and though the white disk is, of course, seen as darker than the white it " really " is and less " pronounced," it is nevertheless seen as brighter than it " ought " to be. Katz (13) placed two colour wheels side by side near a window; between them he put a screen which shadowed one of them. On the shadowed wheel he put a white disk, and the problem was: what sized sector of black would have to be added to a white disk on the other and well-lighted disk to make it equal in brightness to the shadowed one. In one instance the match was made with 120 degrees white plus 240 degrees black. When the two disks were observed through a " reduction " screen, the match was 22 degrees white to 338 degrees black. A photograph, reproduced by Katz (13, p. 132), shows that the camera, like the eye looking through the " reduction " screen, " sees the colours in terms of the intensity of the light reflected, but the observer, not looking through a " reduction " screen, sees the shaded disk as possessing the whiteness which it " really " has though the amount of light reflected " ought " to make him see something darker.

With constancy phenomena as well as with the seeing of things, what we see is a matter of the patterned effect of stimulation and not the transmutative effect of past experience. Juxtaposed areas of stimulatedness, because of their configural tension, will make us have a visual field " carved

out" into things, and the laws of configuration must be such as to provide for the constancy of shape, size and colour of the things we see. Experience comes in to touch up the picture, to give meaning to the things, and to provide an aura of recognitive familiarity which clings round some of them, but it will not account for the fundamental scheme on which it works.

Illusion.—When we perceive something and discover that although there is something there to be seen (in contradistinction to hallucination) it has not the characters we see it to have, we speak of an "illusion."

We need not consider the obvious epistemological questions which cluster round the notion of a thing appearing to have qualities which it does not have, but we must insist that psychologically the illusory presentation is as much a presentation as any other. The discovery that the expectations to which it gives rise are not fulfilled makes us say that we "thought" or "imagined" that we saw such and such, but did not "really" see it. This is a most unfortunate expression; if we see two lines as unequal, we see two unequal lines, even though a ruler placed against one marks off the same number of units as it does when placed against the other.

There are at least three kinds of "recipe" for the production of illusory percepts:

(1) Certain arrangements of stimuli provide us with illusions. Instances of this will be found in numerous illustrated books on psychology. The linear illusions are frequently called after the psychologists who have discussed them: Zöllner, Muller-Lyer, etc. If you draw two equal straight lines, one under the other, you see two equal lines; if you now draw at each end of one line two smaller lines making arrow heads, and at each end of the other two lines pointing outwards instead of inwards like the other one, you will see two unequal lines (Müller-Lyer illusion). By the addition of lines you change the appearance you have started with. Two objectively equal curved areas look unequal when placed one above the other. The cinema can mislead

us with respect to the size of the actors by suitable arrangement and size of furniture, etc.

These illusory effects are of importance to modern theory of perception because the problem is raised : how can the transmutation of equals into unequals take place ? If you adopt the " constancy hypothesis," that the same stimuli always have the same effect, you have to invent unconscious judgments in order to account for the change in the perceptions which has taken place without a change in the stimuli. If, with " Gestalt " psychologists, you say that the effect of a stimulus depends on the other stimuli which are operating at the same time, then it is not a matter of surprise that the addition of more stimuli, or rather the changing of the environing stimuli, should make a difference to the effect of those which have not been altered.

(2) Interest, desire, expectation. We may be caused to have an illusion, not because of the juxta-position of presented elements but because of our state of mind. A flag round a pole may look like a monkey, a motor-car may be " heard " by the listening ear before it is really there, and so forth.

(3) Abnormal conditions : suggestion, pathological condition, drugs. Under hypnosis we can be readily induced to have illusions. In certain abnormal mental conditions we may interpret tactile sensations as electrical stimulation from a hostile source. People on the brink of delirium tremens may feel the touch of illusory hands on their shoulders, and we have already mentioned similar effects caused by other drugs.

Imperception.—Patients suffering from " disease of the cerebral arteries, in states of exhaustion, in acute and chronic alcoholism and in other intoxications " (14, p. 126), can often hear, feel, taste and smell but make mistakes about what they are perceiving. " If you show him a button-hook and he cannot tell what it is, you have a case of visual imperception, if you jingle a handful of coins behind his head and he says you are shaking a box of pills, he is afflicted with auditory imperception " (14, p. 125). Sometimes a person may re-

cognise one object, *e.g.* a button-hook, and then, when he is shown another, *e.g.* a knife, he says it is for boots and shoes, and so on with a number of objects (agnostic perseveration).

Hallucination.—An hallucination is a presentation which is had in the absence of an assignable external stimulus. In certain pathological conditions, voices may be heard, " distinct and often very loud." Stoddart reports a case of an epileptic " whose aura consisted of the following visual hallucination : Thirteen men stood before him, the first turned and walked away, the second turned and walked away, the third did the same and so on until the last man hit the patient, and he had a fit " (14, p. 131). The hallucinations of the sufferer from delirium tremens are familiar to readers of philosophy, and the visions of a sick person in a fever are familiar to every one. Stoddart mentions " psycho-motor " hallucinations : part of the body is falsely perceived as moving. " One patient used to have the feeling that her arm had darted up and struck a nurse, and she always had to be reassured that nothing of the kind had happened " (14, p. 134).

An interesting point about hallucinations is that objects in their neighbourhood are not perceived, and Stoddart reports that he has " known several patients with whom auditory hallucinations were unceasingly present and to whom it was necessary to shout in order to make myself heard " (14, p. 137).

The matter of hallucinations is a delicate one when we come to consider the visions of mystics and the apparitions which are reported to have been seen in haunted places. In any case, the cause of hallucinations is obscure, though it would seem that one factor which plays a part is the unconscious system of tendencies which overcomes the " reality " principle and presents the conscious mind with presentations which are connected with the repressed desires and attitudes. It is, however, perfectly possible that there should be hallucinations (and illusions) for which no " tendencious " interpretation can be given, but which are due to some unusual method of exciting the physiological areas

involved. The difficulty with visions and apparitions is that we do not know whether the presentation was caused by (1) a system of desires, expectations, fears or the like, or (2) a physiological abnormality, or (3) telepathically, or (4) by the causal action of something " there." Scientific parsimony bids us explore the first three possible explanations before we fall back on the fourth.

Perception of movement.—The conditions for the perception of movement are certain systematic changes of stimulation within a relatively unchanged field.

Perception of our own movements.—This is produced by successive innervation of nerve endings in the joints, tendons, muscles, etc., and may be accompanied by the visual perception of a limb as moving. It is also influenced by alteration of pressure in the semicircular canals (*cf.* p. 241).

Perception of moving things.—A. (1) Successive stimulation of neighbouring points of the retina or skin in a field which remains relatively constant is the most usual cause of the perception as a moving object in the field of vision or across the body.

(2) Successive change in apparent size with constancy of " real " size produces the impression of movement in the third dimension. This is also true of changes in loudness and brightness.

(3) The perception of a moving object may be produced by successive stimulation of non-neighbouring regions of the retina, provided that certain conditions are fulfilled. The conditions have been formulated by Korte, and concern the functional relationship between intensity, time-interval, and distance apart of the stimuli required to produce the movement effect.

This so-called illusory movement was first investigated in detail by Wertheimer in 1912. He called it the " ϕ phenomenon." The instrument used for the successive presentations is called the " stroboscope " and the effect is sometimes called " stroboscopic movement." It is familiar to us all from the cinema and those electric signs, which appear to move, while really successive lights are being switched on and off.

Wertheimer used two lines, a horizontal one, and one set at an angle, and his instrument was so devised that he could present first the one and then the other. If he presented them too slowly the subject saw two appearances, if the time interval was too small, the subject saw the two lines at once making an angle, but there was an " optimal " interval in between, such that the oblique line appeared to move into the position of the horizontal and one single line was seen to move up and down. If you alter the intensity of the stimuli, you will have to alter the temporal interval, and if the distance apart of the areas affected is altered you will again have to alter the temporal interval. The direction of the motion observed may vary with the attitude of the observer, and with the way the figure is " taken " : *e.g.* the present writer exposed two white lines crossing like a St. Andrew's Cross, as one figure, and a broad horizontal line as the other : when the first figure was taken as " two lines crossing " the motion was in the frontal plane and the lines opened and closed like scissors whereas when it was taken as a cross it seemed to fall over towards the observer.

It is further alleged that the perception of tactile movement can be caused by stimulation of non-neighbouring points of the skin.

(4) Short exposure of figures may lead to apparent swelling and contracting, and unfinished figures may appear to complete themselves.

B. *Influence of the framework.*—If the spatial field is homogeneous, we have seen that it is unstable and insecurely structured. Duncker (15) performed experiments on movement perception in the dark. He found that when he presented one light moving slowly and one stationary, the motion was attributed to the one fixated. The non-fixated light was taken as the framework with respect to the other. This means that the perception of movement is dependent on the framework in which it occurs. Koffka goes so far as to predict that if we ever could get complete homogeneous stimulation we should not be able to perceive movement at all. Certainly stationary lights fixated in a darkened

room tend to appear to move, and this has been put down to the movement of the eye itself (auto-kinetic movement), but it is not certain whether the eye need move for the phenomenon to take place.

It is, of course, a familiar fact that the movement perceived when we are sitting in a railway train varies with a change in the parts of the field taken as framework : in the station the neighbouring train shares the framework quality of the buildings and therefore we appear to move when the systematic stimulus changes occur ; the framework preserves itself as long as possible. If you look over a bridge at the moving water and take it as framework, the changes in the stimulus will manifest themselves as a motion of the entire bridge and you on it.

The influence of the framework makes it impossible for us to generalise about threshold values. Myers writes that : " an angular movement of between 1 ft. and 2 ft. per second can immediately be detected when the marks on a rotating drum are regarded. This threshold, however, is immediately raised to about 20 ft. per second when the drum is viewed through a slit so that surrounding resting objects are cut off from view " (5, p. 228).

De Silva remarks that distance may decrease the perceived rate of movement : " An automobile travelling at 60 miles per hour will appear to be moving rapidly at a distance of a few yards but slowly at a distance of a few miles " (7, p. 267).

It is also to be noted that " the threshold for movement is higher for peripheral than for foveal vision " (5, p. 228).

It is important to notice that the perception of movement is *sui generis*, and cannot be analysed into successive visual (or tactile) sensations. According to Wertheimer the ϕ phenomenon may appear as " pure movement " without anything moving, but such a suggestion so outrages our customary ways of thinking that it causes acute discomfort to many psychologists.

Perception of time.—Time has been called an inner sense, and this is an appropriate expression because we seem to live through it rather than " in " it, and because alterations in

ourselves make so much difference in our apprehension of intervals and the rate at which time passes. It is true that many of us are so adjusted (conditioned) to certain fixed intervals of conceptual time, that we are able to estimate longish intervals with a fair degree of accuracy. Just as dogs can be made to salivate after an interval, by having food presented a certain interval after a bell has been rung, we tend to map out our days in food intervals, and get hungry at the appropriate times (Semon's " Chronogeneous ecphoric action ").

We also apprehend ourselves as living " in " time in the sense that we envisage our lives as occupying a part of an indefinitely long stretch, and people differ with respect to the distance before " now " and after " now " that seems " real " to them. This is doubtless a matter of experience and learning, but it must not be confused with conceptual time which is a matter of abstraction. It is bound up with the integration of the personality. Some people live from day to day, and each day begins a relatively new life, for others the hopes and fears of " now " are closely bound up with what has happened in the recent or distant past. Similarly, for some people next week, or next month are " real " but next year may not be a practical consideration, while for others the present is a preparation for a relatively distant future.

When we come down to small intervals within the range of experimental investigation, we find that the senses vary with regard to the interval between stimulations requisite for the apprehension of succession, *e.g.* for hearing electric sparks the threshold is two thousandths of a second, while for successive touches on the tips of the fingers it is about fifty-five thousandths of a second.

We also find that the estimation of how long intervals are depends on what has been happening in them. On the whole, an interval filled with activity of our own seems shorter than an interval during which we are not specifically occupied, while an interval filled with stimuli (clicks or continuous sound) tends to be judged longer than an interval of the same objective length which is " unfilled."

Rhythm.—Just as we can apprehend co-presented stimuli —lines and patches—as belonging together in a pattern, so when certain recurrent accentuations succeed one another, we apprehend a characteristic " belonging-together " among the items, which establishes attitudes of expectation and which we call " rhythm." When a series of sounds of the same intensity are separated by equal intervals below a certain size, we tend to impose a rhythm on them (" Subjective rhythm ").

A rhythm, once established, is a structure which can be repeated with other material than that through which it was apprehended, and material embodiment can even be omitted here and there without destroying the structure.

Para-normal awareness.—" *Psychometry* " : It is alleged that some persons, who are gifted with peculiar sensitivity, can give information about the people who have owned an object, if that object be placed in their hands.

" *Chryptoscopy* " : If an object or a piece of written script be enclosed in an envelope or wrapper, certain gifted persons are said to be able to say what the object is, and what the script conveys. *E.g.* (16) Tischner took at random one of four scripts and handed it to a " sensitive " ; on the script was written " Julius " and the " sensitive " said : " very neatly written—quite fine letters—one word, the first letter is ' i '—' in '—no—I think it will go now— ' Julius.' I can't make it anything else."

Mention of such phenomena is not made because any satisfactory explanation is at hand to account for them, but because it is of great importance that psychologists should not shrink from penetrating the obscurities of psychic research ; there is sufficient evidence to invite investigation, and the position of an ostrich with its head buried in the sand is neither dignified nor helpful.

Theory of perception.—The details of perceptual theory are complicated and it is impossible to deal with them in a book of this kind, but the main differences between the various views are easily delineated.

We believe ourselves to know a considerable amount

about the stimuli in the geographical world. We have instruments for measuring the wave-lengths of "light," the wave-frequencies of "sound" and so forth. We can therefore envisage the physical world as bombarding us with stimuli, and theoretically, we can give a list of all the stimuli operative at any moment. We know very little about the nervous system, and we know a great deal about the phenomenal world, in fact it is the only world we know directly.

We therefore have three systems: the physical stimuli, the nervous system, and the phenomenal world, and the theory of perception is the attempt to see how they fit.

There are, roughly, three types of theory:

A. *Atomic.*—The early psychologists analysed the behavioural world into qualities (colours, sounds, etc.) which they could link up with measurable physical stimuli. The qualities are called sensations and were the "elements" out of which they thought the perceptual world to be built. Every stimulus was conceived of as always causing the same sensation, and the "things" which we perceive were believed to be made up out of the elements of sensation, transmuted in some way or other. Somehow the interval had to be filled between the sensations, which every one agreed we never had in their pure form, and the perceptions which were the subject-matter of the inquiry.

This meant that there were the following items to be accounted for:

(*a*) The perception of form, thing-hood, depth, meaning, which are over and above mere sensations.

(*b*) Cases where the same stimuli can give rise to different percepts:

(i) Puzzle pictures in which after a while, *e.g.* a face is seen outlined by lines which hitherto have been perceived as parts of something else.

(ii) Ambiguous pictures which can give rise to alternative percepts.

(iii) Cases in which the "same" after-sensation is seen of different sizes according to the projection ground (*cf.* p. 320).

(iv) All cases in which alteration of the environment makes a difference to parts that have not been altered, *e.g.* illusions.

(*c*) Cases in which change in the stimuli is not followed accurately by changes in perception. *E.g.* constancy phenomena (*cf.* p. 257).

The clothing of the elements with meaning, the seeing of trees and houses, was supposed to be due to some fusion between the elements and the traces left by past experience (" assimilation," " mental chemistry," " apperception "). According to the degree to which writers are impressed by the difference made by interest, attitude and other " subjective " factors, the transmutation process will be regarded as more or less active, *i.e.* less or more mechanical.

Illusions and such-like dislocations were alleged to be due to unconscious acts of judgment.

This type of theory is unsatisfactory because it introduces (*a*) elements of which we are, in their purity, unaware, and (*b*) unconscious acts of mind for which there is no evidence, and which always have to be dragged in to help the theory out of a difficulty.

B. " *Gestalt* " *theories.*—The various schools which emphasise the importance to psychology of the concept of " Gestalt " or " form " or " configuration " disagree on many points, but they agree that there are no elements and no unconscious acts of mind. They are impressed with the way parts of the field of perception belong together and seem to be mutually dependent. The unity of a figure, whether it be a tune, or a shape, or a theme, or a total visual field, is for them the most significant fact about the perceptual world. They therefore point at every turn to ways in which some item of awareness (or action) has some of the qualities which it appears to have, in virtue of the nature of the whole organisation to which it belongs. So far, and this is important, the " Gestalt " way of looking at things is mainly a naïve descriptive way ; they insist on the importance of the whole-wise approach when we analyse the nature of the phenomenal world which calls for explanation.

They insist on the immediacy of what we perceive, and thus do away with "sensations" as "laboratory artefacts."

The school associated with the names of Koffka, Köhler and Wertheimer do not stop at mere description; they want to link up the perceptual world with the nervous system. The two are "isomorphic"; the shapes and configurations in the one are the manifestation of the shaped and configurated systems of tension in the other. As an example let us take the figure-background phenomenon; there is a certain tightness and compactness about the figure which marks it off from the background, and this is thought of as being the phenomenal counterpart of a characteristic energy-distribution in the optic sector, which involves a compact set of happenings in one place held in equilibrium by the same amount of disturbance spread more thinly over a wider area. This is only a very rough account, but it illustrates their contention that the configuration of the phenomenal world is the counterpart of the configuration of the energy-distribution in the nervous system.

Köhler believes that certain physical occurrences which have nothing to do with nerves or living tissue, can only be understood, and have long been understood, as configurations, so that for him and his school there is independent evidence for configurationism in the geographical world. The truth or falsity of this does not prejudice the truth or falsity of configurationism in the nervous system.

By way of contrasting the two theories we may say that the atomists believe in the sequence:

Stimuli—mosaic of point disturbances in nervous system—mosaic of sensations—act of mind (or some transmutation or other)—phenomenal world.

For the "Gestalt" school the series is:

Stimuli—organisation of energy-distribution in nervous system—phenomenal world mapped out according to the energy-distribution in the nervous system.

There are the following objections against the theory:

(i) There is a danger that we may think we have an explanation when we have not. Granted we are going to

establish some connection between the perceptual world and what is going on in the nervous system, and granted that Köhler may be right in saying that configurations are common objects in the physical world, we can only define the configurations in the nervous system which correspond to the configurations in perceptual experience, by reference to the latter, which the former are called upon to explain. If we are asked : " What configuration in the nervous system causes me to have this configuration before my mind ? " we can only reply, " The configuration which corresponds to the configuration which you have before the mind." We do not have independent access to the nervous configurations. This objection is not, of course, fatal, because we may some day get to know more about the working of the nervous system.

(ii) Although Koffka admits that the attitude of the observer may influence what he observes, this important fact does not fit very conveniently into his theory. The configurations we perceive are what they are because of the energy-distribution in the nervous sectors involved, and their alteration and development are interpreted in terms of the laws which govern the distribution of energy, that is to say, the configurations are self-regulating in an important sense, and do not require any act of determination to see such and such on our part. This objection is more serious. It might be that, in accordance with its laws, the whole personality assumes the configuration which is represented in consciousness by a determination to see, say, an ambiguous figure in this way rather than that, and that this configuration determines the configuration, which is responsible for our seeing the figure in a specific way, to establish itself. Certainly some place will have to be found for the " subjective " factors which appear to influence our perceptions.

C. *Central theories.*—There are two kinds of central theory : (1) those which admit elements (sensations) and introduce a central factor to " interpret " them, and (2) those which deny elements, but introduce a central factor to account for configurations.

We have already mentioned the first set, when dealing with the atomists. Petermann (17), a sympathetic critic of the " Gestalt " school of Koffka, Köhler and Wertheimer, puts forward a theory of the second variety.

Such theories as these are bound to be somewhat amorphous, and are liable to be displeasing to many temperaments. What, it is asked, is the central factor ? What performs the " act of judgment," what takes up the attitude ? So far no answer can be given. Stern speaks in terms of a personality which is, for him, the initial unit of psychology, and which, in some way, lies behind or beyond mental and bodily happenings. Common sense speaks of " the mind " and merely conceives of a non-physiological agent, and those psychologists who put forward a centralist position are in no better case. The theory of perception is, for the moment, faced with this dilemma : if we give a self-regulating account of perception (whether in terms of mental chemistry transmuting elements, or self-regulating " Gestalten "), we cannot find place for the apparent activity of the observer; if we bring in the observer, we clutter ourselves up with a " something, we know not what."

From a heuristic point of view, the theories of the " Gestalt " schools have proved invaluable, and even if we are eventually driven to the vitalism from which these schools have tried to save us, it will be because of the tremendous contribution which they have made.

List of books referred to :

(1) Stern: Allgemeine Psychologie.
(2) Driesch. The Crisis in Psychology.
(3) Stratton. Psychological Review, III and IV.
(4) Metzger. Psychologische Forschung, 13, p. 6.
(5) Myers. Textbook of Experimental Psychology.
(6) Koffka. Principles of Gestalt Psychology.
(7) Boring, Langfeld and Weld. Psychology.
(8) Foundations of Experimental Psychology. Ed. by Murchison.
(9) Young. Journal of Experimental Psychology, 1928, p. 399.

(10) Hartmann. Psychologische Forschung, 3, p. 319.
(11) Thouless. Psychologische Forschung, 19, p. 300.
(12) Beryl. Zeitschrift fur Psychologie, 100, p. 344.
(13) Katz. The World of Colour.
(14) Stoddart. Mind and its Disorders.
(15) Dunker. Psychologische Forschung, 12, p. 180.
(16) Tischner. Telepathy and Clairvoyance.
(17) Petermann. Gestalt Psychology.

Chapter XIII.

SENSATION.

Koffka and his school think of sensations as "laboratory artefacts," abstractions from the field of perception which it is fatal to perceptual theory to take as the elements out of which that field is built.

With this theory we are in agreement, but certain interesting facts have emerged from the investigation of simple presentations, and with these we shall be concerned in the following chapters.

Before we embark on the special senses, there are one or two points which concern "sensation" in general:

(1) Sensations are said to have "intensity," "protensity" or "duration" and "extensity" or "bigness."

(2) *Weber-Fechner law.*—Weber made a detailed investigation of the familiar fact that increments in stimulation vary in their effect according to the state of stimulation on which they supervene. This is really an instance of the influence which the field has on additions to it, and a remarkable constancy was observed. If you bring a candle into a room already lighted with electricity it will make less difference than if you bring it into a room lighted by another candle. The "just perceptible difference" is a constant fraction of the already existing stimulation to which the new stimulus is added. For light the fraction is about 1/60, for weight about 1/52, for tone about 1/12, as given by Boring, Langfeld and Weld (1, p. 199). According to Myers (2, p. 245) the fraction for light is about 1/100, weight about 1/30, and intensity of noise about 1/3. The figures differ instructively enough, and depend on the experimental conditions.

Fechner, working on these data, and assuming that you could take sensations as units to be added and substracted, constructed an elaborate mathematical theory to prove that a sensation is proportional in strength to the logarithm of the stimulus.

Such a law only holds within certain limits, and under certain laboratory conditions.

(3) *Synæsthesia.*—Occasionally one meets with people whose senses are intimately connected, so that when they are stimulated by one kind of stimulus they are reminded of stimuli of another sense. The two senses that are so intimately related are usually sight and hearing. Numerous instances of " colour hearing " are known and have been examined by psychologists (3, p. 228). Middle C in one instance was " Prussian blue," while a pitch of 1200 " might be yellow." The composer Scriabin was synæsthetic in this way and wrote a piece of music to be performed to the accompaniment of a colour organ.

Though actual cases of synæsthesia are relatively rare, and though they differ in the colours they connect with given sounds, the intermixture of qualities from one sense with those of another is common enough in everyday speech : a " hard " red, a " soft " green, a " shrill " or " loud " colour, and so forth.

Various explanations have been suggested :

(1) *Experience.*—The subjects have associated the colours with certain sounds. This would account for individual differences, but not so well for the commonly accepted metaphors of speech.

(2) Colour sense is not equally differentiated in all subjects. There is evidence that children only distinguish between " warm " and " cold " colours (4, p. 267) at an early age. The names of colours among primitive peoples and ancient peoples are defective : the Greeks had no word for " blue " or " brown " (5, p. 16). It is therefore suggested that perhaps colour differentiation is a matter of development, and if that is so, then perhaps all sensory differentiation is, similarly, a matter of development, that is to say,

organisms started by being generally sensitive to stimulation of all kinds, and then gradually became responsive in one way to light rays and in another way to sound waves. If this were true, synæsthesia would be an instance of an atavistic undifferentiated response.

(3) Hartshorn (6) advances an even bolder suggestion. According to him sensations are in a sense the solidified projections of emotional disturbance. Yellow is gay, not because we feel gay when we see yellow, but because we see yellow when we feel gay. There are two points in favour of such a theory : (*a*) certain colours are appropriate to certain emotions, colour and sound notoriously arouse emotional conditions, and language supports this close association : " dreary " colours, " depressing " sounds, etc. ; (*b*) the way in which our interests influence our perceptual field, the close connection which we have emphasised between one aspect of organic functioning and all the others, warn us against taking the naïve view that our sense organs are merely avenues through which we see and hear the world as it really is : they are rather avenues through which we receive stimuli which we make use of, and which affect every part of our being. In spite of these important facts, the theory of Hartshorn goes too far in the direction of subjectivity ; after all, the sad and the gay will not differ from one another in the colour which they will ascribe to a field of marigolds. For all that it would seem plausible to account for synæsthesia, sensory and verbal, as being due to the ramifications of stimuli through the remoter regions of ourselves.

(1) Boring, Langfield and Weld. Psychology.
(2) Myers. Textbook of Experimental Psychology.
(3) Myers. British Journal of Psychology, 1911, p. 228.
(4) Koffka. Growth of the Mind.
(5) Myers. Experimental Psychology.
(6) Hartshorn. The Philosophy and Psychology of Sensation.

CHAPTER XIV.

SIMPLE VISUAL PHENOMENA.

IN visual perception we always have forms before us, and we cannot get, as it were, " behind " the forms to see what they are made of, but we can concentrate on certain characteristics of the visual field and notice what determinable qualities are present, so that by using simple situations we can correlate determinate values of these qualities with changes in the physical stimulus, or with changes in the receiving instrument.

There are three factors operative when we have visual experiences, the mind, the body, and the physical stimulus. For our purposes we are assuming the mind to be " normal," though we must remember that with a normal optic apparatus, and physical stimulation, it is possible for psychogenic inhibition to prevent visual experience from taking place.

The eye.—The eye is a round camera with a hole (pupil) facing the outer world. Just inside the hole is the lens which is alterable in convexity, and beyond that lies the " sensitive " side of the camera, the " retina." The central portion of the retina (the " fovea ") is the area of clear vision. Nerve endings, which are used for seeing, lie in the substance beyond the retina. They are of two shapes : rods and cones. These are unevenly scattered about the eye ; the fovea being rod-free and the rods increasing in frequency towards the outer areas of the retina.

This instrument may be misshapen in various ways. The outer transparent surface (cornea) may be imperfectly curved (astigmatism) ; the retina may be too near the lens so that

light-rays are focussed beyond it (" long " sightedness), or too far from the lens so that light-rays are focussed at a point between the lens and it (" short " sight). The lens is so arranged that light-rays coming from an object more than about 20 ft. off are focussed on the retina; when the object is fixated, and when we want to look at something nearer, we automatically innervate certain muscles (accommodation) which causes the lens to become more convex. These muscles wear out in old age. To correct all these focussing errors, we place ground lenses in front of our eyes.

The condition of the eye varies from daylight vision to twilight vision. The pupil enlarges for twilight vision to allow more light to enter the eye, and the sensitivity of the eye varies from one condition to the other. For daylight vision (phototropic) the centre of the retina is most sensitive to greenish-yellow (554 mm.). For " dark-adaptation " (scototropic) the maximum sensitivity is for a stimulus giving a greener colour (511 mm.) (1, p. 72), and the same is roughly true for daylight rod vision.

As the energy of the light weakens, the eye becomes more sensitive to shorter wave-lengths, so that reds will look darker and darker while blues will look lighter and lighter as the daylight fades (Purkinje's phenomenon). Eventually the chromatic element will die out altogether (desaturation).

The stimuli for vision are electro-magnetic disturbances of a wave-like character. The wave-lengths are measured in " millemicrons," the energy is usually measured in photons. The range is from about 800 mm. to 365 mm.

Characteristics of visual phenomena.—Objects, volumes, and areas are either chromatic (" coloured ") or a-chromatic in their appearance. In spite of ordinary usage we shall speak of " chromatic colours " and " a-chromatic colours," so that a grey surface will be said to be " a-chromatically coloured."

Surface-colour.—Sometimes the colour seems to lie along the surface of the object, and belongs to it. It is seen as illuminated by a certain illumination, which may vary from time to time, and the surface-colour need not change in step with the change in the illumination (*cf.* p. 259).

Film-colour.—A " film-colour " does not belong to a surface. It looks as though it had a certain depth, and, although it may be localised away from the observer, it seems as though it filled a certain area rather than being spread over it. If you look up at the sky on a clear day, the blue you will see is an instance of a film-colour. If you look at a surface through a tube, and if the illumination is such that you cannot see the grain of the surface, the area at the end of the tube will be coloured with a film-colour. Gelb (2) had a patient for whom those surfaces which were seen by the normal eye to have a surface-colour spread over them, appeared to be coloured by a film-colour, so that when he tried to write on a piece of paper, he felt as though his pen were dipping into the surface on which he wanted to write.

Volume-colour.—This, as the name implies, is seen as filling an area relatively well-defined. A glass ball or a vase of water, or a fog with a wall seen beyond it provide us with instances.

Lustre.—" Lustre-light does not lie in the plane of the object to which it belongs, but appears rather either *before* the object or *super-imposed on* it " (3, p. 24).

Luminosity and glow.—In these phenomena the light seems to come from within the object—flames, phosphorous, etc.

Glitter.—A time-consuming phenomenon implying motion, but not analysable into a succession of luminous points.

Laboratory work has been almost entirely concerned with surface- and film-colours. The chromatic colours vary in hue, saturation and brightness, the a-chromatic colours vary only in brightness.

Brightness.—By " brightness " we do not only mean high degrees of brightness which we should call " bright " ; we have in mind, rather, a scale from black to white through all the intermediate greys, and by means of this scale we measure the sensitivity of the eye to light stimulation. Chromatic experiences can also be compared with respect to brightness : the brightest point in the spectrum for rod-free areas being greenish-yellow (554 mm.).

Brightness values vary with the following factors:

(1) Dark adaptation and daylight vision.

(2) Intensity of stimulus.

(3) Wave-length: For daylight vision the maximum brightness is greenish-yellow; for dark adaptation the maximum brightness moves towards the shorter wave-length.

(4) Brightness of the surrounding areas: If surrounding areas are brighter than the given area, the latter is seen brighter than would have been the case with a less-bright surround.

(5) Size of object: If the area stimulated is reduced beyond a certain limit, no vision ensues, *i.e.* brightness is reduced to zero. If two neighbouring areas be stimulated, each of which by itself is too small to produce vision, the threshold may be crossed ("summation of stimuli"). This points to some transverse connection between points of the retina.

(6) Mixture of stimuli: The brightness of a mixture is greater than the brightness, which would be produced by the simple wave-lengths which form the mixture.

(7) If two brightnesses be mixed on a colour wheel, the resultant brightness, after flicker has been overcome, is equal to the brightness of each stimulus added together and spread evenly over the whole area (Talbot-Plateau law).

Hue.—Chromatic appearances are usually discussed in connection with the spectrum. White light can be split up into all the possible pure colours, except the violet-purple group, which are formed by a mixture of red and blue. Other colours and shades are obtained by mixing spectral colours with members of the a-chromatic group. Colours can be mixed either by mixing the light-rays, or by means of the colour wheel. This apparatus consists of one or more wheels on which disks of coloured paper can be mounted, and revolved. If you take a disk of one colour and on it place a sector of another colour, when the whole disk revolves the two sectors of different colours do not stand out, but merge. When the wheel is revolving

slowly the disk seems to flicker, but when it is revolving above a certain speed, which varies for various mixtures, flicker will be abolished and the surface will be seen as having the same colour all over. The mixing of colours for the purposes of psychological investigation must not be confused with the mixture of pigments.

If we include the violet-purple group, there are about 156 distinguishable chromata. As we pass along the spectral band, four colours stand out: red, yellow, green, blue; they appear simple and independent, while the intermediary colours look as though they had something in them of the simple colours on each side of them: *e.g.* there is a reddishness about orange, and members of the range between green and blue are usually described as "greenish-blue" or "bluish-green." For this reason the colours red, yellow, blue, green are called "psychological primaries." This does not mean that the intermediary colours are not immediately seen as, say, orange or purple, nor does it mean that these colours are seen as mixtures, it means that when we reach the psychological primaries we seem, as it were, to turn a corner, after passing through steps leading from one primary to the next. For this reason the chromatic colours are often represented as forming a square.

The wave-length values for the primaries are: red, 760; yellow, 575; green, 505; blue, 478.

Hue varies with (1) wave-length, as we have seen, and (2) energy increase: reds, orange, and yellow-green get yellower, and blue-greens and violets get bluer (1, p. 70).

Saturation.—Colours can be arranged on a scale from a "de-saturate" white, through paleness past a peak of saturation, through dark shades to a "de-saturated" grey or black. Saturation varies with:

(1) Change of energy: decrease leads to de-saturation, and then there is a range of low brightnesses (a-chromatic) before brightness reaches zero and nothing is seen. This interval between the threshold for brightness and the threshold for colour is called the "photo-chromatic" inter-

val; it is larger for short wave-lengths, smaller in the centre of the retina.

(2) Size: within limits and with small areas the saturation increases with size.

(3) Brightness: increase in brightness is attended with an approximation to de-saturated white, decrease is attended with an approximation to de-saturated grey.

(4) Saturation of a mixture is lower than the saturation of individual components.

(5) In the spectrum the saturation is lower in the middle than at the ends.

Colour mixture.—Bichromatic mixture. If a colour at the long wave end of the spectrum be mixed with shorter and shorter wave-lengths, the results of each mixture will be the colour intermediate between the two wave-lengths. This will continue to be the case until a wave-length is reached which, together with the original standard, produces a de-saturated (a-chromatic) result. The colour associated with this new wave-length is said to be "complementary" to the standard. The primaries, blue and yellow, are complementary, and so are red and greenish-blue. If we now continue to take ever shorter wave-lengths and mix them with the standard with which we started, we shall produce colours intermediate along the short wave-length band between the original and the variable, until we pass the bounds of the spectrum and our mixture will be among the violets and the purples.

We have suggested taking a long wave-length as the standard for these successive mixtures, but the principle is the same whatever standard we choose: the colour corresponding to every wave-length will have its complementary. It is important to notice that a suitable mixture of red and green, with suitable brightness ratios, will give us an unsaturated yellow. The psychological primariness of yellow, therefore, has nothing to do with the homogeneity of the stimulus.

Trichromatic mixture.—If we mix red, a colour in the neighbourhood of spectral green, and a colour in the neighbourhood of spectral blue in certain brightness ratios and

certain proportions the result will be a-chromatic, and if we change the proportions and brightness ratios we can produce any spectral colour we like. For this reason red, green and blue are sometimes called "stimulus primaries." These three colours are not the only triad capable of generating a-chromatic and chromatic phenomenon in this way, but these are peculiar because they are all spectral colours, while the other triads include shades not found in the spectrum.

Binocular colour mixture.—If one colour is presented to one eye and another to the other, two things may happen: there may be "binocular rivalry" in which case the two colours will alternate, or there may be fusion. If there is fusion, the result is much the same as would be the case with the mixture presented to both eyes at once: yellow to one eye and blue to the other fuse into an a-chromatic colour, and suitable red and green, one to one eye and the other to the other will give yellow. This indicates that central factors (from a physiological point of view) are concerned in colour vision.

Black.—The perception of a black area is not associated with any wave-length or mixture of wave-lengths exciting the area of the retina involved. This has led to a pseudo-problem. It has seemed odd that where there is no stimulus, we should nevertheless have a "sensation" and people have even denied that black is a "sensation" at all. From a phenomenal point of view, this is sheer nonsense. A black patch is characterised by a determinate value of colour just as much as a green patch; as an appearance, black is not an absence but a presence. The problem arises because of the correlation of atomic sensations with isolated stimuli. If we take the view that what happens in one area of the field of vision depends on what is happening or has happened in other fields, or in the same field, the fact that there is a black patch seen becomes explicable. The conditions for its apprehension are: either an area of low brightness value surrounded by an area of high brightness value (simultaneous contrast) or a state of low excitation immediately succeeding a state of high excitation (successive contrast). "In prac-

tice," writes Troland, "difficulty is found in identifying absolute black, so that brilliance (brightness) measures are usually relative to some arbitrarily chosen dark colour" (4, p. 171).

If the eye is not stimulated, the field is not black but a curious dark grey, which is sometimes called the "ideo-retinal" light, or the "own-light" (Eigen-licht) of the retina.

Simultaneous contrast.—If a grey patch be surrounded by a coloured border, the patch will tend to be tinged with the colour complementary to the colour of the border. This, however, depends on the forms involved. If the outline between the central field and the surrounding field be well marked, the contrast phenomenon is diminished. To see the phenomenon best, the surrounding lines can be blurred by putting a piece of tissue paper over the whole figure. If a grey ring be placed on a ground which is half-red and half-green so that one half of the ring lies on the red and the other half lies on the green, the ring will look grey. If now a ruler is placed along the line separating the red and green, the whole figure is altered into a semicircle lying on red, next door to a semicircle lying on green, and the former will look greenish and the latter reddish. It is as though the circle on the double background could preserve its independence, while a semi-circle on a homogeneous background could not.

These simultaneous contrast phenomena can be produced binocularly, and Müller reports a case of a man who suffered from an injury to his head, and lost the power to see contrast phenomena, which seems to show that here again central physiological factors play a part.

Successive contrast.—Complementary colours figure again in the phenomenon of successive contrast. If a green patch be fixated, and the eye then turned to an a-chromatic surface, a patch will be seen of the complementary shade (red). These phenomena will be dealt with on page 320.

Colour-blindness.—There are three varieties of colour-blindness :

(1) (*a*) Unable to distinguish red and green, but sensitive to the whole length of the spectrum ("deuteranopes" or "photerythrous").

(*b*) Unable to distinguish red and green, and spectrum reduced at the red end. Maximum brightness shifted towards the green ("protanopes" or "scoterythrous").

(*c*) "Anomalous trichromates": (i) under-sensitive to green ("deuteranomalous trichromates"), (ii) undersensitive to red ("protanomalous trichromates").

N.B.—Such persons are sensitive to yellow.

(2) Blue-yellow blind.

(3) Total colour-blindness.

Theories of colour vision.—The following are the most important theories which attempt to account for our seeing of colours. The key to the situation is the colour yellow. We have seen that an unsaturated yellow can be produced by suitable mixtures of red and green, and also that yellow seems to be a psychological primary on a par with red, green and blue, and that people suffering from the three kinds of "red-green" colour-blindness can see yellow.

The fact that red, green and blue can be mixed so as to produce a-chromatic sensations and yellow has led to trichromatic theories, and the fact that red and green, blue and yellow, white and black are associated together has led to six-colour theories.

Young-Helmholtz theory.—There are three kinds of nerve fibres which respond to red, green and blue. When these are stimulated in various proportions you have all the colours. Colour-blindness is due to the absence of one of the factors. Negative after-sensations are due to fatigue of the factor which has been excited. Simultaneous contrast is due to unconscious argument: grey on green is tinged with red because you imagine that the grey is seen through the green, and you know that if this were the case the "real" colour must be red for you to see it as green, and therefore you proceed to see it as red. Besides

the obvious difficulty of accepting the account of negative after-sensations and simultaneous contrast, the theory does not account for the perception of yellow by colour-blind persons, who have not the adequate apparatus for perceiving it.

Hering's theory.—There are three pairs of chemical processes each of which works in two ways : " anabolically " (green, blue and black) and " katabolically " (red, yellow and white).

Simultaneous contrast and negative after-sensations are due to the " anabolic " process giving place to the " katabolic " or vice versa. Colour-blindness is due to the absence of one of the processes.

Müller's theory.—Much the same as Hering's except that he introduces six central values as well as the six peripheral ones. This is important in view of the possibility of binocular contrast (see p. 284).

Ladd-Franklin's theory.—This is a developmental theory. At first there were only grey sensations, then the a-chromatic " atoms " divided into two kinds which, when stimulated together, give a-chromatic sensations, but when stimulated separately give yellow and green. Then the yellow " atoms " divided and give us two more colour processes, red and green, which, stimulated together give us yellow. Colour-blindness is due to a regression to a more primitive state of development. This is in accordance with the view that colour vision in the child is less differentiated than colour vision in the adult. There seems to be an important division first between " warm " and " cold " colours, before the warm are separated into red and yellow, and the cold into green and blue (*cf.* p. 276).

Eridge-Green's theory.—This is also a developmental theory, but is distinguished by the view that colour vision is dependent on the variety of disturbances caused in one substance, and the substance is " visual purple." This means that we see different colours because of differences in the stimuli combined with our capacity to reflect them, rather than because we possess different apparatuses for

their reception. One difficulty is that visual purple is only found in the rods, and von Kries has shown that the rods are responsible for dark-adapted vision, and not for daylight vision, which is transmitted by the cones. Eridge-Green, however, declares that visual purple is to be found in the rod-free areas.

Visual acuity.—Visual acuity varies with the stimuli. It is measured in terms of the angle subtended at the eye by the interval discriminated. When it is a matter of perceiving an interval between two figures, *e.g.* two lines, the angle may range between 30″ and 60″, but varies with the size of the figures, and the illumination. The threshold which gives rise to judgments of difference is smaller, and this is also true of the threshold for the perception of a lack of alignment between two straight lines placed end to end (" vernier " threshold). Visual acuity of the first kind is probably due to brightness variation, while there is reason to think that the " vernier " threshold is determined by the delicacy of the mechanism underlying localisation (5).

(1) Purdy, in Boring, Langfield and Weld. Psychology.
(2) Gelb. Zeitschrift fur Psychologie, 84, p. 193.
(3) Katz. The World of Colour.
(4) Troland, in Foundations of Experimental Psychology. Ed. by Murchison.
(5) Wilcox and Purdy. British Journal of Psychology, XXIII, p. 233.

CHAPTER XV.

SIMPLE AUDITORY PHENOMENA.

The ear.—The ear can be divided into three parts: the outer, the middle and the inner ear. The outer ear consists of the pinna and the channel into the side of the head which ends in the ear-drum. The middle ear is a box containing a group of bones, the most important of which are called the hammer (malleus), the anvil (incus) and the stirrup (stapes), because of their shapes. The "handle" of the hammer is attached to the ear-drum and the head is connected with the anvil in such a way that when the hammer moves backwards and forwards with the ear-drum, the anvil moves as well. The anvil in turn is connected with the stirrup in such a way that when the anvil moves from side to side the stirrup plunges in and out of a little window which leads into the inner ear. Thus, if the pulsation of the air-waves on the ear-drum makes it move, the handle of the hammer moves as well, the anvil moves on its pivot and the stirrup moves in and out of its window.

There is a channel between the middle ear and the nasal cavity which is called the "eustachian tube," and which is of great importance because the pressure of air in the inner ear has to be about the same as the pressure of air outside, and when we swallow we open the "eustachian tube" and thus preserve the equilibrium of air pressure.

The inner ear is very complicated. It is joined up with the semi-circular canals which are responsible for our balance (p. 241). The part of the whole structure which is important for hearing consists of a conical mass round which is wound a kind of pipe, and this shell-like affair is called the

"cochlea." The pipe, which is like the channel which runs up and round conical shells, is divided into three channels by two membranes which run the whole length of the pipe but for a small area at the top, where the membranes join and the two outer channels run into one another. The middle channel is filled with the same fluid as that which fills the semi-circular canals. The outer channels are filled with a fluid into which the stirrup plunges backwards and forwards. If we were to follow the course of a pulsation from the stirrup we should go up one channel (scala vestibuli) through the little opening at the top and down the other outside channel (scala tympani) which comes to a full stop close to a window covered with a membrane. The other side of this window is the middle ear, and the membrane bulges in and out as the fluid is compressed and expands under the influence of the action of the stirrup.

Of the two membranes which divide the pipe into its three channels, one, the "basilar" membrane, is very important. On it are the so-called "hair cells" which are immediately connected with the nerves of hearing; they have hairs projecting from them of varying lengths. The whole is completed by a membrane (tectorial membrane) which curves over the hairs and which is believed to be involved in the physiological processes which accompany hearing.

The instrument may go wrong in various ways. Violent stimulation may cause destruction of part of the inner ear. This has been found to be the case in deafness of boilermakers. It is reported that "in Leningrad 50 per cent. of boiler-makers suffer from inner ear deafness after 10 and 80 per cent. after 20 years' service" (3. p. 304).

The commonest cause of deafness, however, is the malfunctioning of the eustachian tube. This may be due to a variety of factors, and upsets the pressure equilibrium between the inner ear and the outside world. It is such temporary obstruction that makes us slightly deaf when we have a cold. Other causes of deafness are serious damage to the ear-drum, or malfunctioning of the bones in the inner ear.

We do not yet know exactly how the instrument functions,

and therefore cannot pin down any given abnormality to the malfunctioning of any given part, but presumably such abnormalities as tone deafness and the insensitivity to tones at various parts of the scale (islands of deafness), which is far commoner than one would think, are to be correlated with some abnormality of structure and functioning in the ear.

Diplacusis.—Sometimes the same physical stimulus causes different pitch perception from one ear to the other.

Paracusis.—Deaf people sometimes claim that they can hear better in a noise. This is held to be due to the fact that such persons are usually deaf to low pitches, which are the ones most prevalent in common noises, so that the higher pitches of the voice come through without being "masked." It is also pointed out that the speaker is likely to speak louder when he has to make himself heard in a noisy environment.

Physical stimulus.—The source of those disturbances which make us have the experience of hearing sounds is a vibrating object. This causes alternate compression and expansion of the groups of particles in its neighbourhood, which is passed on until the energy is exhausted. The rate at which the disturbance travels varies with the medium: it goes faster in water than in air.

There is a very important class of disturbance which is distinguished by being regular or periodic. If you swing a pendulum backwards and forwards and draw a piece of paper at a regular rate under the pendulum, so that as it swings it makes a mark on the paper, the pattern will be a "simple harmonic wave." This is the way in which we could represent the simple expansion and compression of neighbouring groups of particles under the influence of certain simple vibrations. The most important piece of information we can get about such waves is their frequency per second.

Now supposing you had two vibrations of different frequencies co-operating, the resulting compound wave would not be a simple up and down wave picture, it would be more

like a chain of mountains, up a little, down a little, then up higher and then down, and the trough of the wave would imitate the pattern of the crest. This would be because the waves, coming at different rates, would sometimes help and sometimes diminish one another's action. The frequency of such a "compound" wave is a matter we shall consider later.

Although the compound wave is composed of two vibrational frequencies, it must be considered as the precipitation of them both, and as having a shape and character of its own; it is periodic, *i.e.* it performs the same pattern over and over again, only the pattern is a complicated one.

The remarkable fact we now have to mention is that it has been found that all periodic wave motions can be regarded as though they were made up of simple harmonic waves of various frequencies (Fourier's law). This does not mean that these frequencies are all present at the same time, the frequency of the compound wave as a whole is what matters when we are concerned with the frequency which is being exemplified at the time, and this is determined by the lowest frequency which the compound wave contains. We often speak of the compound wave as being "analysable" into simple harmonic components, but this is somewhat misleading; the analysis is purely mathematical. What is meant is that the wave has the shape which a wave would have if it were generated by a combination as simple waves of such and such frequencies all operating together.

To return to sounds and the waves which cause us to hear them: so far we have discussed simple and compound periodic waves, but some physical sources produce disturbances which are not periodic. It is alleged by some that even in the most irregular series of disturbances we can discover periodic factors, the significance of which will appear later.

In the behavioural world we distinguish between musical tones and noises; the former are caused by periodic disturbances and the latter by a-periodic disturbances and periodic disturbances of very high or very low intensities.

Although most of our auditory experiences are made up of noises, the work that has been done in laboratories has been almost exclusively concerned with tones. The reason for this is that there is a regularity about periodic vibrations which is absent in a-periodic ones, and the stimuli can be serially altered and the effects examined ; with the effects of a-periodic disturbance we can do little more than describe and catalogue the phenomena.

Tones.—Tones differ from one another in the following ways : pitch, octave quality, loudness, brightness, volume, timbre and vocality.

Pitch.—The pitch of a tone produced by simple periodic vibration is correlated with the frequency per second, if the intensity is constant. The frequency is measured in v.d.'s (vibration doubles) : each v.d. being a complete return of a disturbance to its starting-point. The greater the frequency the higher the pitch, and the lower the frequency the lower the pitch. With high frequencies an increase in intensity will tend to raise the pitch, while with low frequencies an increase of intensity will tend to lower the pitch (1, p. 112).

The range of audible wave-frequencies is from about 20 v.d. to about 20,000 v.d. in young persons, and decreases with age : Gildemeister found 15,000 v.d. for the middle thirties, and 13,000 v.d. for the fifties as the upper limit (2, p. 278).

The threshold of intensity required to produce a tone varies with the frequency. It is measured in "dynes" (root mean square of change of pressure in the tympanic membrane) and varies from about ·15 dyne at 60 v.d. to ·001 dyne at 1000 v.d. "at which value it remains constant up to about 4000 v.d. Thereafter the sensitivity decreases" (3, p. 281).

The smallest variations in pitch which are discriminable varies from person to person and from frequency to frequency. Stumpf gave as his own threshold for discrimination : ·25 of a vibration at 200 v.d., ·28 at 400 v.d., and ·24 at 600 (3, p. 278). In general one can say that between

100 v.d. and 1000 v.d. the increase in frequency required to give the least perceptible change in pitch is constant and is given by Ogden (2, p. 52) as " approximately one vibration per second," but " at the rate of 3000 v.d. the differential increment must be increased to about 10 vibrations : while at 4000 and above more than 40 vibrations may be required."

Octave quality.—The correlation of pitch with frequency gives us the picture of a straight line from low to high notes, but such a picture does not correctly represent the facts. As we pass up the scale of pitches, we reach notes which have some similarity to notes which we have left behind ; there is a similarity between a note correlated with a certain frequency and the note correlated with twice that frequency. This interval is called the " octave," and the revised linear representation of pitch dimension is a spiral, each curve of which represents an octave, and corresponding points of which are occupied by notes at octave distance from one another.

Revesz further suggests that there is a certain similarity of " quality " between all the notes of a given octave, so that every tone, according to him, has not only pitch, but also octave quality as well.

Loudness.—The loudness of a tone is dependent on (1) the amplitude of the vibration, and (2) the frequency :

(1) If we keep the wave-frequency constant and start with very small amplitudes the phenomenal effect is noise ; if we increase the energy we become aware of a tone with pitch, with further increase of energy the loudness of the tone increases, then it becomes noise, and eventually painful. With great intensities a tactual component is added and a deaf person may become aware that something is going on.

(2) The intensity of stimulus required to produce painful sensation varies with the frequency, increasing up to about 800 v.d. and then diminishing (3, p. 280). If we keep the energy constant and vary the frequency, the loudness will increase up to about 2000 v.d. and then diminish (1, p. 191).

Brightness.—This quality is a matter of a considerable amount of dispute. The word is taken from the visual

field and the quality to which it refers in the auditory field seems to follow pitch: low tones are described as "dull" while high tones as "bright." Abraham, however, found that by altering the wave-length and keeping the frequency the same, he could produce tones differing in brightness (4).

Volume.—Watt points out that notes vary in "size"; some notes, low ones, are "large" and "massive," while others are "thin" and high-pitched at the same time. This distinction forms the basis of his theory of the physiology of hearing. The difficulty is that people do not agree about volume. Banister suggests that volume is inversely proportional to the definiteness of localisation: a sound definitely localised sounds "smaller" than a sound vaguely localised.

Timbre.—The same pitch produced by a piano or a violin will vary in quality with the instrument. This difference is a difference in "timbre." It is here that our knowledge of the "analysis" of compound vibrations is useful. The waves which are responsible for our hearing a note played on a piano are compound ones, and their shape is what would be expected if frequencies were combined having the ratios 1, 2, 3, 4 . . . to one another, the frequency having the number 1 in that series being the lowest frequency represented, and, therefore the frequency of the compound wave in its own right. Supposing, then, the piano were sending out a wave at frequency 100 v.d. per second, the wave would have the shape precipitated by frequencies of 100, 200, 300 . . . all combined. The wave-frequencies above that which gives the frequency of the compound note as a whole, are often called "partials" or "over-tones." This is cannonised by usage, but is liable to be misleading, because it makes us forget that a compound sound-wave is only compound in a *mathematical sense* and that it is in no sense made up of a number of little waves. Similarly, the sound which we hear, when we listen naïvely, is one sound and not a number of little sounds. Difference in timbre is associated with difference in shape of the compound wave, and this can be expressed in terms

of a difference in the intensities of the "partials," into which it can be analysed, from one timbre to another. Sometimes, indeed, the shape of the compound wave is such as to exclude certain "partials."

E.g. the relative intensities of "partials" for piano, violin and flute pipe of organ, stopped and narrow, are represented by A. Wood in "The Physical Basis of Music," page 158, as follows:

Partials	1	2	3	4	5	6	7	8
Piano	100	99·7	8·9	1·2	0·01	—	—	—
Violin	100	25	11	6	4	3	2	1·5
Organ	X	—	x	—	x—	—	—	—

Ohm's law.—We said above that when we hear a note from a piano or a trombone we usually hear one note and not two, but certain people by nature, and most people by training, can hear more than one note: they hear the fundamental note corresponding to the frequency of the wave operating upon them, and they may also hear a note corresponding to twice that frequency, and, possibly, another corresponding to three times the fundamental frequency. It is as though, under the special physiological conditions of "listening," the ear could "analyse" the shape of the periodic disturbance of the ear-drum and actually hear some of the notes corresponding to the frequencies into which it has been analysed. This is called "Ohm's law." Besides unaided listening, suitable resonators can be made to resonate on the same principle: a resonator made to respond to a certain frequency will resonate when a compound wave of half (or a third, etc.) that frequency is produced near it. This is sometimes thought of as though the sounds corresponding to the "analysed" frequencies were lying about waiting to be enlarged, which is, of course, nonsense. The total disturbance, when a note is played on a violin and one of its "partials" resonating from a suitable resonator involves two sources of disturbance, the string of the violin and the resonator which it has caused to be active, and the listener will probably hear two notes (if not more).

We have insisted on the theoretical nature of the "overtones" as constituents of a compound wave, but this does not mean that the complicated, but mathematically regular, construction of the wave is unimportant. As we have just seen, it is possible for an acute hearer to hear tones which correspond to wave-frequencies which are represented in the constitution of the compound wave, and when more than one such wave is in action the total result will be mainly determined by the shapes of the waves, and what will happen can be roughly predicted if we split the compound waves up into their theoretical constituents and suppose that they are all operating at once, some of them reinforcing one another and some getting in each other's way. This is of importance for the understanding of harmony and disharmony (see p. 300).

There is another way in which the "partials" may play an important part. If, instead of analysing a compound wave, we build one up, we do not require all the theoretic constituents to precipitate the whole wave. "Any three consecutive tones of a series of ten, with frequencies 100, 200, 300, etc., to 1000 v.d. per sec., such as 300, 400, 500, or 700, 800, 900, etc., gave a compound tone of the same pitch, *viz.* 100 v.d. per sec., but of varying quality, provided the intensity was not too low" (3, p. 287).

Vocality.—According to Köhler (5) certain pitches can be heard as certain vowels: middle C (256 v.d.) sounds u, its octave (512 v.d.) o, and so, mounting by octaves, we hear successively a, e, i, and then above that s and f and ch, while below middle C, at 128 v.d. we hear m. These vocalic qualities have been called into question, but there certainly is a variable vocalic nuance as we proceed up the scale, and it seems to vary in the neighbourhood of successive "C's."

Vocables.—It must be noticed that we have been speaking of a vocalic nuance of certain pitches. When we come to the tonality of vocables we find the situation exceedingly complicated. The sounds that we make are produced by the vibration of the vocal chords and disturbances in the

mouth. According to Helmholtz, the champion of the "partial" tones, the vocal sounds differed on account of the resonance in the mouth of suitable partials. This would mean that vowels could only be produced if the requisite partials were present to be reinforced. Ludwig Hermann, however, believed that each vowel is related to a disturbance in the mouth cavity, which is relatively independent of the pitch voiced from the larynx. The structure responsible for the vocable he called the "formant" and associated each "formant" with a position in the tonal series. This view is now widely accepted, though the detailed structure of the "formants" is not agreed upon, and their tonal position is difficult to establish. The researches of Stumpf and Miller have, however, led to results in mutual agreement as to the latter problem. They have assigned tonal areas to each vowel (2, p. 82). The question still remains: how are the wave-frequencies in these areas modified when they produce vowel sounds rather than tones? Jaensch and Lachmund discovered that by disturbing simple wave-frequencies, either by adding neighbouring wave-frequencies or by varying their amplitude, or in both ways, the tones were altered in the direction of vocality; the tonal quality faded and a vocalic quality emerged. It is therefore suggested that when we hear a vocable, the stimulus pattern can be theoretically analysed into wave-frequencies corresponding to the voice-tone and a complex of disturbed frequencies from whatever area of the frequency-series is responsible for the vocable we are hearing. This view holds for consonants as well as vowels, though there are more noise factors at work when we hear them than when we hear the latter. A further disputed point is the relation between the voice tone and the "formant." They are separate concepts because we can say a vocable at various pitches. According to Hermann, who is supported by Lachmund, the "formant" is not a harmonic of the voice tone. Stumpf, however, says that it must be, and it certainly would be simpler if it were, because we know that the human vocal apparatus pro-

duces compound waves, and all we should then have to suppose is that the structure of the " formant " is such as to modify the " partials " which fall in the areas belonging to the various vocables. In such a way, Helmholtz and Hermann would be brought together ; the partials of the voice tone would be involved (Helmholtz), but the modification which they would undergo would be sufficiently strange to merit a special name (Hermann's " formant ").

When we are considering the perception of words we must not think of them as merely a congeries of vowels and consonants, because the " shape " of the sound of the word as a whole has to be considered. Von Hornbostel discovered that if he distorted the partials of the vowels and consonants " S," " T," " I," and " L " so that they were unrecognisable, the word " Stil " was recognised when they were combined.

In all hearing the total pattern predominates, and should not be thought of as being constructed by adding one sound to another (6).

Combination of tones.—When two waves with different frequencies are operating at the same time, their combined effect involves phenomena in addition to the harmonic or disharmonic chord :

(1) *Beats.*—When two neighbouring wave-frequencies are combined, they interfere with one another and give rise to a pulsating of the sound. The number of beats per second is equal to the difference between the wave-frequencies. As the difference between the wave-frequencies increases, the " beat " phenomena change in quality. Myers (7, p. 37) distinguishes four stages : (*a*) surging, (*b*) thrusting, at about 16 beats per second, (*c*) rattling at about 30 beats per second, and (*d*) roughness after which they disappear.

Beats may be heard when the two wave-frequencies are operating on different ears, but the quality of the phenomenon is rather different and the tone is felt to swing from one side to the other (3, p. 292).

(2) *Intertone.*—When the two primaries are in beating range, but not too close, a third tone is heard—the inter-

tone. " It is of softer character than the primary tones and is localised in the ear " (7, p. 38). The pitch lies between the two primaries.

(3) *Summation-tone.*—Also localised within the ear are tones corresponding in pitch to frequencies equal to the sum of the frequencies of the primaries.

(4) *Difference-tone.*—Of like character are tones which can be heard corresponding in pitch to frequencies equal to the difference between the frequencies of the primaries.

These two last-mentioned phenomena are called " combination tones," and they are due to some characteristic of the total stimulus pattern and not to internal factors, as may be proved by the fact that suitable resonators can be made to resonate to summation frequencies and difference frequencies. They can also be heard by separate binaural application of the primaries.

Harmony and disharmony.—We have gradually complicated our account of the sources and phenomena of tone perception. We started with simple (sine-) waves, we then saw that musical instruments produce compound waves which could theoretically be analysed into sine-waves of varying frequencies. We now see that combination of these compound wave processes produce a total wave pattern of enormous complexity, and we can therefore not be surprised at the richness of variety in sound-quality which is produced when several notes are struck at once on an instrument. The dimension which we bring in here is " consonance "— " dissonance." At one end of a scale we have certain pairs of notes (octaves) which are sometimes confused with single notes, so intimately do they fuse, next comes the interval of a fifth and other intervals follow in decreasing consonance and increasing dissonance.

If we map out the " partials " of two compound waves, one of which is twice the other in frequency, we shall find that they overlap : *e.g.* 100 v.d. has **200**, 300, **400**, 500, **600**, while 200 v.d. has **400**, **600**, **800**. . . . If we do the same with the fifth, of which the primaries are related as 2 : 3, we shall have, *e.g.* 200, 400, **600**, 800, 1000, **1200**, and 300,

600, 900, **1200**, and as the chord decreases in consonance, the analysis of the " partial " will overlap less and less. These facts led Helmholtz to suggest that our experience of consonance and dissonance is due to the overlapping or non-overlapping respectively of partials (with " beating " in some cases where there is no overlapping). This will not do, however, because reinforcement (overlapping) merely makes tones louder and therefore there is no reason why they should *fuse*, and when you mix wave patterns which are as simple as possible, there is no diminution of consonance with appropriate ratios.

Krüger believed that fusion was due to the absence of interference between the primaries and the difference tones to which they give rise when sounded together. Dissonance is due to the roughness of the total sound for which beats are held responsible. This view is unsatisfactory because certain dissonances are produced by primaries whose difference tones could not produce " beats."

Such theories are of the atomistic order—they depend on the analysis of the tone into its alleged component parts. Stumpf, on the other hand, insists on the individual nature of sound-wholes. Watt, who believed that volume is the most important characteristic of tones, put forward the view that consonance is to be referred to a balanced or unbalanced relation between the volume of primaries concerned. Unfortunately it is difficult to make the volume of consonant primaries, considered separately, agree with the symmetry demanded for his theory of consonance.

So far, in fact, no satisfactory theory has been advanced. A further point must be added : this question of consonance and dissonance is closely connected with the question of harmoniousness and disharmoniousness, which, again, is connected with musical taste. Moore (8) has shown that with practice we may alter our judgment about the harmoniousness of a combination, and therefore it would seem that the experience of consonance and dissonance may be associated with far-reaching emotional disturbances which involve more than the auditory apparatus for their explanation.

Masking.—Two wave-frequencies do not always produce a combined sound. If they differ in intensity and are outside beating range, the weaker may be " masked " by the stronger which alone produces a sound.

Theories of hearing.—A brief reference to the theories of the physiological basis of hearing is added because, although the matter belongs to the realm of physiology, the adequacy of theories is partly a matter for the psychologist to decide ; the psychologist provides the material which have to be explained, and the physiologist not only attempts an explanation, but often suggests a line of research for the psychologist to follow up.

Sound-pattern theory. Ewald.—When sand is scattered on a plate which is then set vibrating, various patterns are made in the sand which differ according to the vibrational frequency. Ewald suggested that such sound-patterns are produced on the basilar membrane, and that the nerve impulses vary with the pattern produced by different vibrational frequencies. He made a model of the tympanic membrane and claimed to demonstrate its varying capacity for producing sound-pictures. The objection to such a theory is that the complexity of the sound-patterns and the variety of different ones required to account for the richness of auditory phenomena are too much for the material to sustain.

Telephone theories.—A number of theories associated with the names of Rutherford, Wrightson, and Meyer all have in common the notion that the basilar membrane as a whole, or in part, vibrates in response to the plunges of the stapes. The vibrational pattern is conveyed to the fluid and thence to the membranous structure. The nerves are not separated out into specific responders, as in the case with " resonance theories " discussed below, but each nerve is supposed to be capable of conveying any frequency, and therefore the difference between what happens when we hear one pitch and what happens when we hear another is a matter of different impulses running up the same nerve or nerves. The difficulty is that a mammalian nerve is not capable of conducting more than 700 impulses per second (9, p. 318).

These theories also break down over combination-tones; either they provide for more than there are, or they do not provide for enough.

Volume theory.—We have already mentioned that Watt was particularly impressed with variations in volume from low frequencies to high ones. He suggests that low tones disturb larger areas of the basilar membrane and high ones disturb smaller ones. The middle of the area as the most disturbed part and the most agitated nerve fibres are responsible for the pitch of the tones heard. The objection to this theory has been indicated above: volume varies from person to person with the same pitch, and is not constant for the same person.

Resonance theories.—The most famous type of theory is that of Helmholtz, which has recently received considerable support from Hartridge. According to this theory the fibres of the basilar membrane resonate to different frequencies and these resonating fibres " analyse " a compound wave into its constituents. The various areas of the basilar membrane which resonate to various frequencies are associated with their own sort of nerve fibres. It has been objected that the variation in length of the fibres (·04 to ·49 mm.) is too small for them to be able to resonate to the enormous range of pitches which we can hear (7, p. 55), but on the whole the resonance theory is the most plausible, and support is given to it by the " islands of deafness," and by the fact that partial deafness has been found to be connected with the destruction of certain parts of the cochlea, while dogs are said to " become deaf to high tones when the lowest whorl of the cochlea is destroyed, and to high tones when the highest whorl of the cochlea is destroyed " (7, p. 48).

Volley theory.—Wever and Bray (10) have put forward a " volley theory," which is similar to the telephone theories in that nerves are supposed to respond to a variety of vibrations, and the resonance theory in that the position of the fibres involved is of importance. They get round the limitation of the nerve fibres with respect to the number of

impulses they can convey by supposing that a *total* number of impulses per second can be made up by combining the action of several fibres (1, p. 136).

Noise.—When the stimulus pattern is made up of a number of a-periodic vibrations, or when the intensities of periodic vibration are below or above certain amounts, or when the number of vibrations is too few to produce a tone, the resultant phenomenal effect is noise.

It is alleged that even the most absolute noise has some pitch, and certainly one can compare one noise with another with respect to " higher " and " lower," or " brighter " and " duller."

The intensity of noise is measured by comparing a noise with a sound whose intensity can be measured in terms of unit steps above the threshold; a standard sound can be used, and the units are called " *decibels*."

Now that the world is becoming more and more noisy every day, the effect of noise on the system is a matter of grave concern. Bartlett (11) notes a significant point: " How rarely," he says, " we meet complaints against noise, how often against a noise " (11, p. 52). Very loud noises, of course, may do damage to the hearing apparatus, but the general effect of noise is more concerned with the way in which it fits in with the tasks in which we are engaged. " On the whole," Bartlett finds, " the more the work puts a demand on the higher mental processes, the more disturbing the noise is likely to be " (11, p. 39). The undermining factor in noise is not so much the actual intensity as the inadequacy of our adjustment to it, the suddenness of it, the distracting force it may have, and, occasionally, some special feature of symbolic importance which is peculiar to the individual. This does not mean that there is no problem in noise, it means that it is more difficult to solve, because its deleterious features are related to us, rather than to the noise itself.

Music.—So far we have discussed tones as they have been examined individually in the abstractive atmosphere of a laboratory. When they are combined in succession, new

factors make themselves felt: expectation and tension. If we play a series of notes on the piano, the individual tones are liable to lose their isolated individuality, and we find ourselves embarked on a whole which cannot be brought to finality by merely lifting our hand from the instrument, but which needs certain notes to be struck before a "satisfactory" end is reached. What notes these will be depends on the musical language we speak, and a sequence will satisfy in Java which would, perhaps, not satisfy the western ear. In the West three principles have been distinguished: "The law of the tonic," "the law of cadence" and the "law of return." Ogden states the first as follows: "In any sequence of tones in which one tone appears whose ratio-number is 2 or a power of 2, all others evince a melodic trend towards it" (2, p. 153). *E.g.* if "c" and "g" (2 : 3) are struck one after the other finality will demand "c," while if "c" and "f" (3 : 4) are similarly struck finality demands "f."

The "law of cadence" is to the effect that, other things being equal, we are most comfortable if we end on the lower of a pair of notes struck in succession, than if we end on the higher; instances of this in everyday noises are: tick-tock, knick-knack.

Lastly, "other things being equal, it is better to return to the starting-point than not to return."

Such principles of expectation and tension are obviously important factors in the total experience of listening to a piece of music, but it would be foolish to suggest that such simple tendencies as these could account for the "musical experience." The rhythmic factor, for instance, must obviously be included, and one cannot fail to see that both tones and noises reverberate further than the ear and the auric sector of the nervous system. The sound of some instruments has an organic effect which shakes us into a state of emotional disturbance, and the complete account of any "musical experience" will have to make reference to our whole being, viscera and all, so complicated are its ramifications.

It is unfortunate that all " pieces of music " should be regarded as coming under one heading, and therefore all judged as having the same effect, just as it is unfortunate that all objects which are called pictures should be treated alike because they are called by the same name, and are usually exhibited in frames. A prelude and fugue by Bach, a tone poem by Strauss, a Viennese valse, a Beethoven symphony, a military band, and a jazz lament for unrequited love, all operate on us differently. There may be some dimension of " good-bad " in terms of which they can be compared, but the total effect of listening to one is different from the total effect of listening to another, because they are attacking us in different ways. Sometimes our organic sensibility is directly agitated, sometimes our imagination is aroused, sometimes our kinæsthetic sense is excited, and sometimes our æsthetic musical appreciation is the most important item. The psychologist is not interested in the " goodness " or " badness " of a work of art, though he is interested in the question : why certain works are judged " good " and others " bad," and a solution of this question depends on a preliminary discrimination between the different ways in which collections of tones (or patches of colour, or arrangements of forms, or sequences of images) may effect us.

Vibration.—The stimuli which proceed from a vibration source do not affect our ears alone. Sounds can be conveyed by bone conduction " when a sounding instrument, *e.g.* a tuning-fork, is brought in contact with the head or teeth " (7, p. 20).

But besides this method of inducing hearing, vibrations can be detected and discriminated by touch. The finger-tips can distinguish between periodic and a-periodic vibrations, and Katz reports the case of a man who could discriminate music by air-waves on his skin (12). Gault discovered that the palm of the hand could learn to recognise the vibration patterns of words, and that without further training this power could be used by the other palm (6, p. 271).

(1) Boring, Langfield and Weld. Psychology.
(2) Ogden. Hearing.
(3) Banister, in Foundations of Experimental Psychology. Ed. by Murchison.
(4) Abraham. Zeitschrift für Sinnesphysiologie. 1920.
(5) Köhler. Zeitschrift für Psychologie, LIV.
(6) Vernon. British Journal of Psychology, XXV, p. 123.
(7) Myers. Textbook of Experimental Psychology.
(8) Moore. Psychological Review Monograph no. 73.
(9) Hartridge, in Foundations of Experimental Psychology. Ed. by Murchison.
(10) Wever and Bray. Psychological Review. 1930, p. 376.
(11) Bartlett. The Problem of Noise.
(12) Katz and Revez. Zeitschrift für Psychologie, XCIX, p. 289.

Chapter XVI.

SIMPLE PHENOMENA OF SMELL AND TASTE.

The sense of smell is correlated with changes in nerve endings in the upper reaches of the nose. The physical stimuli are gaseous substances which come into the nose by respiration or sniffing. The phenomena of smell are not homogeneous. Frequently a "configuration" which we should call a smell has thermal components: *e.g.* menthol is cold and a gaseous substance can give rise to taste experience at the same time, so that we have "sweet-tasting" smells (*e.g.* chloroform), and "bitter-tasting" smells (*e.g.* ether).

The smell apparatus may be put out of action when the nerve endings cannot be reached on account of an accumulation of substances in the nasal cavity, or it may be defective in itself as in the cases in which certain smells cannot be apprehended, though other smells can. Myers mentions instances of insensitivity to prussic acid, mignonette, vanilla, violets, frisia, and benzoin (1, p. 108). Smells may also be hallucinated.

If we keep to "pure" smells we find ourselves faced with a bewildering multiplicity. Zwaardemaker classified the smells as follows:

(1) Ethereal smells. (*a*) Fruit ethers; (*b*) beeswax; (*c*) ethers, aldehydes, ketones.

(2) Aromatic smells. (*a*) Camphor; (*b*) spicy smells; (*c*) anise and lavender; (*d*) lemon and rose; (*e*) almond smells.

(3) Balsamic smells. (*a*) Jasmine, ylang-ylang, orange blossom; (*b*) lily-like smells; (*c*) vanilla.

(4) Amber-musk smells. (*a*) Amber ; (*b*) musk smells.

(5) Allyl-cacodyl smells. (*a*) Sulphuretted hydrogen, asafœtida and like smells ; (*b*) fishy smells ; (*c*) halogen smells.

(6) Burning smells. (*a*) Toast, tobacco smoke, creosol, etc. ; (*b*) benzol, phenol, etc.

(7) Caprylic smells. (*a*) Caproic acid, cheese, sweat ; (*b*) cat's urine, sexual odours.

(8) Repulsive smells. (*a*) Narcotic smells ; (*b*) the smell of bugs, ozœna.

(9) Nauseating smells. (*a*) Putrefying bodies ; (*b*) Fæces, scatol.

Henning attempted to devise a smell scheme. He drew a prism standing on one end, so that you have a triangle at the top and a triangle at the bottom on which the figure is standing ; then at the corners of the top triangle he wrote "flowery," "foul," "fruity," and under these, on the bottom triangle, "spicy," "burnt," and "resinous." These are the primary smells, according to him, and he suggests that every smell can be placed somewhere on one of the surfaces of the prism : thus "the smell of arbor vitæ is flowery-fruity-spicy-resinous, and the odour of onion is mostly foul, but also somewhat flowery, burnt and spicy" (2, p. 147).

Threshold.—The threshold can be determined either by finding out the least concentration of a given solution that can be apprehended, or by finding out the smallest surface covered with the smelling substance which can give rise to a perception. The arbitrary units, invented by Zwaardemaker, for the latter are called "olfacties."

There is great variety of sensitivity for different substances : *e.g.* ethyl-ether, 5·83 mg. per litre of air ; oil of peppermint, ·024 mg. per litre of air ; artificial musk, ·00004 mg. per litre of air (3).

We become adapted to smells after intervals of stimulation which vary from smell to smell and intensity to intensity.

Smelling substances may be mixed, and the result may be a mixed smell, or fusion, or a masking of one smell by another. It is also found that in certain mixtures the odour

compensate one another, so that the result may be much weaker than either odour by itself.

The importance of smell in general experience is less obvious with human beings than it is with those creatures who seek their prey and find their way about by means of it. We do, however, find that human beings are powerfully moved by smells. There is evidence that smell components in an experience may be so closely integrated with other components that when the smell reappears in another setting we are liable to remember the past. There are smells almost universally regarded as pleasant, and others almost universally regarded as unpleasant. Inhibition of childish interest in fæces clearly plays a large part in our smell experience, in fact it may possibly be the prime factor in making some smells pleasant and some unpleasant but fascinating. It is interesting to notice that the very words "smell," "stink," "stench" and "odour" are under an inhibitional cloud, which makes us suspect unconscious motivation at work.

Taste.—The taste experience is a characteristic whole. It is sometimes possible to mention a variety of qualities: thermal, olfactory, tactual and purely gustatory, but the taste is not made up of these added together. The experience of tasting a peppermint involves a variety of nerve endings, but the experience is a unified totality.

When, however, we examine the tongue and certain other internal surfaces of the mouth, we find that there are special "taste-cells" which join together into a taste-bud, and that when these are stimulated certain taste-perceptions will ensue.

In this way four primary tastes have been discriminated: salt, sweet, bitter and sour, and it is thought that certain areas of the tongue are specially sensitive to each: salt at the tip and side of the tongue, sweet at the tip, bitter at the root, and sour along the edges.

It is possible to reduce sensitivity by prolonged excitation of the taste-bulbs by suitable stimuli, *e.g.* by smoking or by smearing with certain drugs.

Typical stimuli for these four sensory qualities are:

hydrochloride acid for sour, common salt for salt, quinine for bitter, and cane sugar for sweet.

Mixture.—If suitable stimuli are mixed, the result is either an unfused totality or a fused totality, or one taste obliterates another, or there is " compensation " in the sense that the components are lowered in intensity. Just as we modify a smell by adding a source of stimulation calculated to damp it down, so we modify the sourness of sour fruit by adding sugar.

Contrast.—When we have been eating something sour and then taste something fairly sweet, its sweetness is intensified, and vice versa. Myers writes: " The (simultaneous or successive) contrast effect of salt is to make distilled water taste sweet, while solutions of sugar, previously too weak to produce a sensation, are now tasted as sweet " (1, p. 105).

We can remind ourselves of the abstract nature of " pure " tastes by remembering what food is like when our olfactory apparatus is clouded with mucous, or when we taste something and hold our nose at the same time. To experience a true acid taste Myers recommends us to paint the tongue with cocaine in order to abolish the astringent effect, but what would a lemon taste like if its astringent effect were abolished ? This is, of course, not to deny the possibility of obtaining salt, sour, bitter and sweet tastes by suitably stimulating the taste-buds, nor are we saying that substances do not, under normal circumstances, taste salt, sour, bitter or sweet; the point is that the providentially large range of " tastes " which we enjoy when we are eating and drinking are in some sense as " pure " or " simple " as the four primaries. Even when we notice certain tactual or thermal or olfactory components, these are not added sensations, which happen to be going on at the same time, they are, as it were, aspects of, or qualities of the taste we are having.

Taste has not fallen into inhibitory disgrace to the same extent as certain smells, and in some culture-patterns conversation on the subject is as free as conversation about

colour is with us ; in many sub-patterns of our own culture, however, it is interesting to notice that politeness forbids exuberant expression of enjoyment.

(1) Myers. Textbook of Experimental Psychology.
(2) Boring, Langfield and Weld. Psychology.
(3) Parker and Crozier, in Foundations of Experimental Psychology. Ed. by Murchison.

CHAPTER XVII.

SIMPLE PHENOMENA OF TOUCH AND ORGANIC SENSIBILITY.

THE whole of the surface of the body is scattered with nerve endings, and there are afferent nerves running from muscles and tendons and from the internal organs.

If the surface of the hand is explored with a small cold rod it will be found that at certain points a sharp sensation of cold is elicited. If it is explored by a warm instrument it will be found that at other points we have a sharp sensation of heat. If, again, we use a firm hair as our exploratory instrument, we feel nothing in some places, but a definite sensation of touch in others. Lastly, if we explore with a sharp instrument, which must be held delicately so as not to puncture the skin, we can map out "pain-spots."

These heat-, cold-, touch- and pain-spots are variously distributed.

Touch-spots.—These are said to be absent in some places, but are present near every hair in hairy regions, so that the touch sensation on the cheek derived from passing one's hand over the face after a close shave is slightly numbed. They are, as might be expected, very closely packed on the tips of the fingers. They are usually aroused to action, not by delicate exploring processes, but by deformation (pull or push) of the skin.

Bare touch with a hair, or a piece of cotton wool drawn over the surface of the skin, does not make up the whole variety of our sense of touch. In the first place, it may be complicated by certain reflexes, as in tickle, thrills, creeping, perspiring, goose-flesh, etc.

Secondly, the succession of different touch stimulations provided by moving our fingers across surfaces provide an enormous variety of tactile experience. Katz (1) has investigated this problem and regards the different surface qualities which present themselves to our touch (rough, smooth, velvet, sandpaper, glass, etc.) as tactile-kinæsthetic patterns. There is only one element, touch (soft and hard), but when touches follow one another in certain patterns, we have smoothness, roughness, velvet, silkiness and so on. Just as the perception of movement is an unanalysable unity, so the perception of these phenomena is unanalysable. The recipe includes the two factors, touch and movement, but the presentation is not the one added to the other. Katz further noticed the extraordinary power of discrimination which we have when our fingers are thinly covered.

"*Vibration sense.*"—Just as configural touch presentations can be produced by compound stimulation, so can the sensation of vibration be produced by stimuli related in certain ways. We have no sense organ for perceiving vibrations, but when we are stimulated in certain ways the result is an unanalysable "sensation of vibration."

Pain.—The pain-spots are more numerous than the touch-spots, and the nerve endings of pain are aroused by a variety of stimuli—cutting, pricking, and extremes of heat and cold. They are variously distributed: *e.g.* tip of nose, 44 per sq. cm.; back of hand, 188 per sq. cm.,; and knee (inner joint), 232 per sq. cm.

It is interesting to notice that more time is required to arouse pain than other senses; when we light a match and burn our fingers, we are aware of the heat before the pain, and the heat is felt as the phenomenal cause of the pain, while actually the heat causes nothing.

The phenomenology of pain is bewildering in its variety. The pain experience is a totality which may have varying rhythmic, temporal, intensity and pressure characteristics, so that we have shooting, gnawing, dull, throbbing pains, and many more besides.

The question as to whether pain can be pleasant or affectively indifferent is difficult to decide. Those who wish to make out a case for nerve endings for pain will naturally say that pain, like any other sensation, can be affectively qualified by pleasure, indifference, or unpleasure, and the sharpness of some tastes, and perhaps a few cutaneous pains may sometimes not be unpleasant. The whole difficulty is that, whereas the pleasantness of certain tastes or smells seem to reside in, or qualify, the tastes or smells themselves, the position in the case of pain is more complicated. There are certain total situations in which pain is a constituent, and which are pleasurably toned, and there are situations in which pain is sought, but the gratification seems to attach to the situation as a whole rather than to the pain element. (1) Some people seek painful sensations because they want punishment, or because their sexual appetites are so organised that gratification of the sex-impulse can only be achieved to the accompaniment of pain. (2) When we have a painful sensation in one place, we often seek a painful sensation in another in order to distract our attention, and (3) it is alleged that some people are bored by the less exciting experiences of everyday life and that pain is welcomed as a vivid flash which illuminates a somewhat monotonous landscape. In all these cases, what seems to determine the affective tonality is the setting in which the pain occurs.

Thermal sensibility.—The heat-spots and cold-spots are dotted about the body irregularly. The heat-spots are present in great numbers in the cheek (av. 1·7 per sq. cm.) as compared with the breast (·30, on side of the finger ·2).

The cold-spots vary from 19 per sq. cm. on the upper lip to about 1 to 2 on the palmar side of the hand. The range of temperatures to which we are sensitive is from about 20° C. to 45° C., taking the skin temperature as slightly above 33° C. When a cold-spot is excited by a stimulus of about 43° C. and over, a sensation of cold is elicited, and when a heat-spot is excited by a stimulus of about 25° C. and under, a sensation of heat is elicited; such phenomena are known as "paradoxical cold" and "paradoxical heat" respectively.

The condition for the temperature experience is a variation in the temperature of the receptors. If the cause of the variation is hot or cold beyond certain limits, heat and cold meet in pain. We have, therefore, to posit a psychologically indifferent temperature which may vary from time to time, and from one part of the body to another, so that what we shall feel will depend on our condition at the moment and area of stimulation, as well as on the physical " temperature " of the stimulus. It will depend also on the nature of the stimulus with respect to thermal conductivity : metal feels cold because it conducts heat from the skin and upsets the balance in that way. The importance of the pre-stimulus condition of the part affected is responsible for the well-known fact that if you put one hand in hot water and the other in cold, and then put both into water of a temperature between the two, the bowl of water into which you plunge both hands is felt to be cold to the one and hot to the other. The projection of the heat and cold into the water has actually made of this phenomenon a philosophical problem, because it is asked : how can the same water be both hot and cold at the same time ?

The cutaneous phenomena are rather embarrassing to the physiologist, because there is no obvious sense organ for each, like the ear or the eye, and yet pain and heat are different from one another and so are touch and cold. It is true that a total experience may be hot, painful, and tactual at the same time, but the heat is distinguished from the pain and the touch. Physiologists are not all agreed as to the end-organs in the skin, which are said to be responsible for these various experiences, and it is held by Nafe (2) and others that quantitative difference (intensity temporal and spacial relation of stimuli, etc.) are responsible for their variety. According to this view there is only one fundamental sensory unit, " feeling," and this takes various forms according to the quantitative value of the stimulus.

Mention must be made of an experiment which has given rise to considerable discussion. Head cut some nerves in his arm and rendered part of his thumb anæs-

thetic. As the sensitivity returned, two stages seemed distinguishable: (1) a stage in which pain- and touch-spots were active, and heat- and cold-spots responded to stimuli above about 37° C. and below about 26° C. respectively; localisation was diffuse, and the awareness of apartness was disturbed. This stage was followed by (2) one in which sensitivity to warmth and coolness (26°-37° C.) returned, and the awareness of apartness was restored. The former was called the "protopathic" stage and the latter the "epicritic," and it was thought that they either represented two systems of nerve fibres, or two stages in neural recovery, and, therefore, possibly, two stages of neural development. The inference drawn from the experiment has been called into question, but the notion of two sensibilities, the one rather poor and clumsy, and the other correcting the defects of the first, being more discriminating, has appeared to some theorists as a convenient picture of psychological structure.

Deep-seated sensibility.—When the superficies of the skin are rendered anæsthetic, pressure and pain sensations can still be elicited by external pressure. These stimuli are mediated by the nerve endings in the muscles. Excitation of nerve endings in muscle, tendon and joints may give rise to ache, strain, etc.

Kinæsthetic sensibility.—Awareness of the change of position of a limb is usually that and no more, that is to say, there is no special *quale*, which is on a par with touch, pain, etc. Of course afferent nerves are at work, but the information they give is of change of position, though this may be *accompanied* by pain, ache, strain or effort. According to Myers: "The kinæsthesis in a slowly moving limb lasts longer than that in a more rapidly moving limb. The kinæsthesis of the toe or elbow is of different quality from that in the finger or shoulder" (3, p. 67). We have to remember, also, that when a limb is moved an alteration is made in the general postural background against which we execute our actions.

Organic sensibility.—Of this there is not very much to be said. Sensations of pressure, fullness and gastric pain are

familiar to every one. It would appear that we get no news of our stomach unless it is functioning abnormally. To the sensations we get from our stomach we may add the various indigestion pains (*e.g.* "heart-burn"), the sensory experiences associated with heart disease, and nausea. They are usually vaguely localised, and often the areas where they are felt to be do not correspond to the disturbances which have caused them.

Ambiguity of reference.—Pain is always regarded as a subjective modification; objects may be said to be "painful," but what we mean is that they are calculated to cause pain.

Touch, on the other hand, is ambiguous. If I touch a surface I may refer the roughness straight away to the surface, but I may disregard the roughness of the surface and notice the touch "sensation" which I am having. The same is true of heat and cold. If I touch a radiator, *it* is hot, but if I hold out my hands to the fire, it is *they* that are hot as well as the fire, and if I go out on a cold day, it is my "sensation" of cold that dominates the perceptual field. It seems partly a matter of where our interest lies, and partly a matter of the "thinghood" of the source of stimulation. The atmosphere is not a thing, like a radiator, and therefore I do not project my coldness into it, but a wind may be a "thing" segregated from other things, and I may very well apprehend it as warm or cold. Another factor may play a part, which may have something to do with temperament; if a person finds that his judgment of the temperature constantly differs from that of others, he may take to accentuating his own sensations of warmth and coldness at the expense of that which might be apprehended as the cause.

(1) Katz. Aufbau der Tastwelt. Zeitschrift füe Psychologie. Erg. Bd. no. XI.
(2) Nafe, in Foundations of Experimental Psychology. Ed. by Murchison.
(3) Myers. Textbook of Experimental Psychology.

Chapter XVIII.

IMAGERY AND IMAGINATION.

In the last few chapters we have been concerned with the effects of stimulation, while the stimulus itself is there. Such, however, are not the only presentational phenomena we have. Sometimes the results of stimulation persist in some presentational form or other when the stimulus itself has ceased to operate, and there is a class of important presentations which occur " in the mind " and which we shall call " images proper."

A. After-Effects of Stimulation.

(1) *Positive after-sensations.*—" When the eye is adapted to dim light, a momentary colour stimulus produces a single colour sensation which is attended by a succession of fluctuating after-sensations of the same hue as the stimulus, followed by a series of colourless after-sensations " (1, p. 84). The same kind of experience may be obtained by closing the eye after a white patch or a bright light has been fixated. The word " positive " is used when the sensory reverberations are a continuation of the " sensation," having the same hue and roughly the same shape. Sight is not the only mode of experience in which such phenomena are to be found. Woodworth remarks : " For a few seconds after somebody has stopped talking, you can still get the sound of his voice, as if in an echo, though you usually cannot recall sounds with any distinctness " (2, p. 114).

We are at once reminded of the general concept of " perseveration."

The effects of stimulation last longer than the stimulus itself, both, as here, in the sensory effects, and in the general response they have called forth in the organism (tunes running in the head, etc.).

(2) *Negative after-sensations.*—If you fixate a red patch and then look at a white or grey wall, you will see emerging on the wall a green patch of much the same shape. White and black, blue and yellow, green and red, are similarly related. If you watch a smoked drum with vertical lines on it revolve and then suddenly stop the drum revolving and keep your gaze fixed where it was, the lines will appear to move in the opposite direction. The same may be observed when you stop a car suddenly: you will feel as though you were moving in the opposite direction.

The word "negative" is used when the sensory reverberation is in some sense "complementary" to the "sensation."

Negative after-sensations vary (1) with the "real" distance of their projection ground: the further away the larger the after-sensation (Emmert's law); (2) with the orientation of their projection ground: an after-sensory effect of a circular figure, which has been fixated frontally, will appear in elliptical projection if the projection ground is apprehended as standing oblique to the observer, *i.e.* it appears as a circle "ought to look" if it were presented on a field obliquely presented to the observer; (3) with the direction of the projection ground: the size being the smaller "the greater the elevation of the line if regarded against the horizontal" (3, 211); (4) with the "apparent" distance of the projection ground: Mrs. Frank discovered that after-sensory effects projected on to different parts of a picture of a tunnel drawn in perspective varied with the apparent distance of the part on to which they were projected; (5) with the figure fixated. Koffka (3, p. 143) reports experiments of H. Rothschild in which the after-sensory effect was more symmetrical than the fixated figure. When the fixated figure is, in Gestalt parlance, "stable," the after-effect is more prominent than in a case in which

the fixated figure is a mere collection of lines, and the after-effect is liable to be " simpler " than the fixated figure.

Eidetic imagery (5, 6).—Some children and a few adults are able to project on to a neutral background a coloured picture which they have been fixating. The colours, in the true eidetic image, are the same as those of the original. The content varies from case to case : some eidetics select in terms of natural objects, *i.e.* they cannot produce an image of a meaningless patch, but can produce one of an object such as a leaf (Jaensch calls this object-wise selectivity " ontotropic ") ; some eidetics, on the other hand, select in terms of personal preference (which Jaensch calls " philotropic "). Occasionally the details in the picture can be altered : " a carriage was made to drive away, turn a corner in the road, and so to disappear entirely from the image " (6, p. 110). In this respect the eidetic image is like the images we sometimes have in our minds' eyes, but the detail in the eidetic image is fuller and more accurate. In one of Allport's experiments a complicated word was read by the subjects from the image, though they could not have " remembered " it in the ordinary way.

These phenomena are of great theoretical interest because of their position between perception and after-sensation on the one hand and imagery proper on the other, and Jaensch has developed a theory of the genetics of perception on the basis of his investigations.

B. Images Proper.

All the phenomena listed under A and all those experiences which we call " perception " have an important characteristic in common ; they are all " over there," " outside us," " objectively before us," and such phrases must be interpreted to include somatic " sensations," such as heart beats or stomach ache ; these are " outside us " or " objectively there " in a sense in which images are not. Of course if there are people who have not had any images—and there are people who make such a claim—all that follows is mean-

ingless for them, but those who have the experience will readily agree that images are, in some sense, " inside the mind," " presented to the mind's eye, ear," etc. in a way in which percepts are not.

The difference between percepts and images is ultimate, and there are no adjectives which apply to the one and never to the others. It is sometimes said that images are weak sensations, but what is usually meant is that the physiological cause of an image is the same as the alleged physiological cause of the corresponding percept, only less in intensity; this may possibly be true, but it does not make the image into a weak sensation. The distinction between an image and a percept is a matter of phenomenology and not causality. It may be that we are faced with a case of two different phenomena whose causes only differ quantitatively, but we ought not to confuse the effect, which is what we are studying, with its hypothetical cause.

It is sometimes said that images can be mistaken for sensations. This is due to a confusion of thought. What is meant is that a sensation has been experienced when an image is expected. Subjects in threshold experiments who are looking out for stimuli of low intensity often respond when no stimulus has been given and claim to have heard or seen that to which they are to make their response. This does not mean that they have mistaken an image for a sensation, but that sensations can be caused centrally as well as by peripheral excitation. The analysis of " I imagined I saw X " is : " I had a percept Y about which I made erroneous judgments." It does not mean that I had an image of X.

Varieties of imagery.—Images may be visual or auditory or kinæsthetic. If you make a list of ten red objects, and of ten squeaking sounds, you are liable to have visual images and auditory images while you are making your lists. If you think about dance steps you may have kinæsthetic images, and when you think at all you may have kinæsthetic images of speech, and also kinæsthetic images which " carry " the ideas of certain relations such as " apartness " or " difference." Now anyone who has noticed what he has before

him when he thinks will find that very often, perhaps always, the experience is not of imagery at all but of incipient movements of the lips and/or larynx. Delicate instruments reveal that when we think we are often making small movements in our throats. In fact it is not at all easy to classify "internal speech" under the heading of percepts or images, and, though images and mutterings, felt as such, frequently occur during a train of thought, it seems phenomenologically false to say that we think in images or muttered speech all the time; it feels more like a cross between the two, for which we have no name, save "internal speech," an important ingredient of which is imagery of *ourselves talking*, which is quite different from ordinary auditory imagery.

Tactual, gustatory and olfactory images.—Can we make an image of the touch of velvet, the taste of treacle pudding or the smell of a rose? Readers must answer the question for themselves.

Individual differences.—It is notorious that people differ in their capacity for forming images, and it has been alleged that the more addicted to "abstract thought" a person is, the less visual or auditory imagery he has, and the more he relies on "internal speech." It still remains possible that such persons may experience kinæsthetic imagery as he thinks and forget to mention it.

It is only possible to find out about a person's imagery by giving him opportunities to have it and then asking him to introspect. It has been found that when people are asked to make lists, such as have been mentioned above, they vary from person to person in the amount of imagery they have, and also in the same person from sense to sense. It has also been found that when subjects are given a group of letters which they have to learn without moving their lips or while making a sound ("Ah.h.h") all the time, the reproductive capacity will vary from person to person, when it is compared with their capacity to reproduce if they have been allowed to read the letters aloud, or heard them read. It is argued that if you have good visual imagery you will be able to take the impress of the sight of the letters and use it for

reproductive purposes, while if you have good auditory imagery you will do better in the task in which the letters are read to you. From the results of such experiments as these, people are divided into " visiles," " audiles," " motiles," according to their most prevalent form of imagery. Such an inference is most misleading, unless is is backed up by introspection ; what has been discovered is that people vary in reproductive capacity with respect to the medium (vision, audition, etc.) in which they have apprehended what they have to reproduce.

Such divisions into " visiles," " audiles," etc., are now rather out of date ; they spring from an analytic, atomising attitude to psychological data which is being replaced by a more " functional " one. This means that we do not regard a person as having a unit faculty for imagery of one kind or another, or as having somewhere about him a collection of visual or auditory images, we rather think of him as being able to use images when necessary, or " function imaginally," when he wants to. This will mean that if a person is interested in some activity which demands visual imagery for its performance it is likely that he will experience more visual images in one day than a person who deals in tasks which demand auditory imagery. Actually most of us, who have imagery at all, use sometimes one sort and sometimes another, and the results of an experiment cannot be taken as indicating the use of imagery on the grounds that it would have been useful if it had been used, because a person may quite well have solved the problem we have set him without using imagery at all.

C. Content of Imagery.

Memory images.—These are apprehended as reproductions of experience, having date and locality. The name " memory image " is often used for a wider category of imaginal processes, but it is convenient to restrict it as above. The image may be fragmentary or relatively complete. It is exceedingly important for theoretical reasons to bear in mind that we may

have memory images which we know to be only partially correct; if memory of the past merely consisted in the having of images which *de facto* were reproductions of percepts, we could not discover their incompleteness, neither could we criticise them and say: " it was not quite like this," because confirmation and criticism both imply some access to the past other than that which is accepted or criticised.

Images of familiar objects.—We may detach from actual dated scenes, and image in no particular surrounding, a familiar object, person, or voice. Woodworth calls attention to the way in which such images follow knowledge and interest. Some students, asked to make an image of their university library, could not count the pillars in front of it from the image, and they objected: " We have never counted those pillars, and cannot be expected to know the number now " (2, p. 113).

Images of typical objects.—We may, if thinking of apples, call up an image of an apple tree, which is not an image of any familiar apple tree, but, as it were, an illustration of an apple tree. Here we have a creative element coming in. It is true that an image of a familiar object may *function* as a representation of a class, but we are here thinking of an illustrative image which may, of course, be analysed into familiar elements, but which as a whole is new.

Creative images.—We can, as suggested above, have images which are made up of parts or qualities not hitherto observed in conjunction: a lion-headed horse, or a black crocus. These may be deliberately thought out, or may arise spontaneously. The variety of qualities and combinations of qualities that we can distinguish is so great that the newness of the creations which we can invent is not the least impaired when we reflect on the statement that what we make up must be made out of perceptual ingredients. Mr. Pickwick and Madame Bovary watching a cockatrice in the palace of Kubla Khan is a novel scene, even though we can trace all the pieces which make it up to sensuous presentation, and since it is the novelty of the combination that matters in invention, the view that nothing

comes out of the mind save that which went in through the senses is false.

Part played by images.—(1) An image may be inspected and taken at its face value. This is not only an exercise in introspection. We may conjure up an image when we want to describe a room, and some people are able to read off an imaged page when they are lecturing or answering an examination paper. Musicians can write down what they hear in their minds' ears, and a painter can often foresee his picture.

(2) Usually the image is a "vehicle of meaning." Like words they may function, not in their own right, but rather as symbols referring to what we are thinking of. It has been suggested that they arise when there is a gap, or when a difficulty is apprehended.

Bartlett (7) insists that we do not store the past up in the form of fixed residues which may fade away, or grow patchy with age, or remain as accessible imprints of experience, but that we assimilate the past in the form of "schemata" which we use when we want them. The schemata are, as the name implies, schematic, and when we want fuller details we "turn round on them" and more detailed information comes into our minds. "In general," he says (7, p. 219), "images are a device for picking bits out of schemes, for increasing the chance of variability in the reconstruction of past stimuli and situations, for surmounting the chronology of presentations. By the aid of the image, and particularly of the visual image . . . a man can take out of its setting something that happened a year ago, reinstate it with much if not all of its individuality unimpaired, combine it with something that happened yesterday, and use them both to help him to solve a problem with which he is confronted to-day."

(3) Occasionally a creative writer will allow a series of images to develop without conscious intervention on his part. For those who are not gifted with such powers of imagination it is difficult to understand what this must feel like, but presumably it is not unlike a coherent day-dream

in whose unfolding the inner witness has a fascinated interest.

Tied and free images.—Stout points out that there is a distinction between those images which are "tied" to perception and those which are free and can come into the mind in the absence of any particular percept. "A hunter seeing a tiger may call up a distinct mental picture of the tiger's coming leap; he has then an explicit idea; but this does not lead him to a train of ideas relating to the nature and habits of tigers" (8, p. 209). This difference is more concerned with the way in which images function rather than with different kinds of imagery; if they are to help us in an immediately present predicament, then they will be severely tied to the situation; if they are to help us to answer a question, or if they occur in a process of day-dreaming, they need not be similarly tied to the perceptual surroundings.

The distinctions which we have drawn between the various kinds of imagery and their "uses" is important from a theoretical point of view. If all imagery were reproductive, however fragmentary, then we could accept the simple theory to the effect that when we perceive something a trace is left of the agitation which corresponds in our brain to the perception in our minds, and that when we have an image the trace is re-aroused and the same agitation recurs, only less intensely. This will not do. We have seen that only memory images are reproductive, and that all others involve abstraction and re-combination of elements. Are we to assign a trace for blackness, a trace for yellowness and a trace for the cat shape when I see a black cat with yellow eyes? Do I draw on these traces again when I image a yellow cat with black eyes? And, if so, what happens when I have a memory image of the black cat with yellow eyes? The simple trace theory is delightfully simple to state but it has never been made to work, and no one has ever been able to produce an atom of evidence for it. Its popularity is largely due to an insufficient analysis of the different kinds of imagery we have.

IMAGINATION.

It is somewhat unfortunate that the words "image" and "imagination" are so intimately connected. It would appear that to say that a person has great imagination meant that he had clear, vivid and various imagery, which need by no means be the case. If I conjure up the image of a street in order to tell my friend which turning to take, I am having an image but not, in an important sense, "using my imagination," while if I am making up a story and describe an imaginary street, I need not have an image, but whether I have or not, I am using my imagination.

In using our imaginations we may use images, thinkings in words, and even percepts. The position is this: we can perceive a spatio-temporal fragment of the "real" world, our perceptions are suffused with meaning, and we can pass beyond the actually perceived part to a notion of other parts of the world, and other times of its being, constructing a lawful and consistent whole. But we can do more than this. We can break loose in "imagination" from the accepted world of reality and consider what might be, or what might have been. In the fields of invention and scientific discovery imagination is used to elaborate the behavioural world and the hypotheses we construct as to its "real" nature, and under such circumstances the imagination is tied by external factors; the framework of a hypothesis is tied to the facts it has to explain, and the invention is a dream until it works.

We do not, however, use our abstractions only to help us in our practical activities; we frequently develop in words and images scenes which we accept as "unreal" but which afford us deep satisfaction.

Day-dreams.—We picture ourselves answering our superiors back, being rich and successful, and having brilliant love affairs. The "wish-fulfilment" element in day-dreaming is patent, and even if we indulge in lugubrious day-dreams it is clear that we are satisfying some obscure, and even unconscious interest.

Fiction.—We imagine characters with definite individualities and weave stories about them. There are degrees of detachment observable. Sometimes the characters are "taken from life," sometimes they are merely outlines of people with no independence of existence, sometimes they are "seen in the round" and move with a reality of their own. Sometimes, again, by means of a story, we point a moral, and sometimes we convey some intimation of profound significance. Imagination here is free to move where it likes within certain limits; there are consistencies which must be observed and which vary from instance to instance.

Fairy stories.—Here we allow imagination greater freedom, but still there are rules to be kept. As we approach the detachment from real life which we call "nonsense," we see that mere free-roving for its own sake is not what gives us pleasure or satisfaction. The content of what we imagine is important even in nonsense verse and Surrealist pictures.

It has been suggested by those psychologists who have developed the three great frameworks of unconscious motivation (Freud, Jung, Adler) that part, at least, of the satisfaction we get from the play of our own imagination, and from the contemplation of the results of other people's imaginings, is derived from the fact that our unconscious impulses can drain off some of their energy in these ways. What kinds of impulses these are is discussed in Chapter VII. The theory is that our behavioural world is more a matter of our own creation than we are used to think, and that at an early stage the real has not been distinguished from the imaginary, so that it is almost as satisfying for an impulse to manifest itself in the form of imaginary satisfaction as for it to clothe itself in "real" performance. This rather startling view has great explanatory value, and for those who find it convenient to depict our behaviour in terms of nerve-impulses it could be stated to the effect that nervous energy, which was inhibited from draining away in the form of muscular innervations, could be partially released in incipient innervations along associated nerve paths.

Among other things this theory of substitute satisfaction

helps us to understand is the constant repetition of the same themes in fairy stories, since the same unconscious predicaments of most of us are similar. Rank has compiled a collection of variants of the incest-motif in legend and fiction, and in some cases claims to show how a comparison of various presentations of much the same theme reveals varying degrees of frankness associated with various culture patterns: Œdipus actually sleeps with his mother, but Hamlet's relations with the Queen are more complicated. Œdipus actually kills his father, but Hamlet is too troubled by conscience to murder his step-father even when he is commanded to do so. Jung, again, analyses the psychological significance and emotional attractiveness of elements in Christian and other mythologies. The whole subject of comparative mythology and religion gains in interest if we believe that the stories which last are the stories which touch on themes of universal interest, because we may thus hope to find out something about the nature of man by inquiring into the fables which he has at one time or another taken for truth.

Another important feature of human nature is thrown into relief by this theory. If imaginary satisfaction is allied to real satisfaction, surely we shall feel guiltier than we "really" are, and since we are unconscious of the impulses we are satisfying, this guilt will be a matter of unconscious attitude in most of us and only come into consciousness in rare instances. Such a picture helps us to see how a person might well believe himself to be guilty and wicked, and so to merit damnation when his life has really been no more blameworthy than that of the rest of us. If we have inside us desires against which we erect barriers of inhibition, and which therefore are "wicked," and if these desires can express themselves in imagination, we cannot be surprised at the invention of Hell to punish us for the rein which we have unwittingly given to our sinful selves. If we are to understand a man's sense of sin, we have to take into account the expression he has granted to his unconscious impulses without knowing what he was at, far more than the peccadilloes he has committed in the light of day.

As usual it must not be supposed that the release of unconscious forces (or " wish-fulfilment ") is the only satisfaction that imagination affords. There is the perfection of the shape of the story which gives us æsthetic delight, there is the " prophetic " element sometimes which illuminates the universe for us, and there is the pleasure we get from amusing and exciting gossip, about a new collection of people. In fact it is fatal here, as everywhere else in psychology, to put all our explanatory eggs in one basket.

Make-believe.—Half-way between real life and the worlds of imagination lies the curious realm of make-believe. For the civilised adult the look of a thing is severely determined by its " real " objective function and nature. For the child it can function as he wishes, so long as it fits in with the exigencies of a play situation. It is not necessary to suppose that a chair which is functioning as a railway carriage really looks like a railway carriage, and that the child is visually deceived ; the point is that the difference between how it is functioning and what it " really " is does not arise. Its function is to satisfy his wishes, and the fact that it has the conventional meaning of a seat does not detract from its functional value as a tool for playing trains. The dominant factor in the situation is the desire of the child, and the objects are used as instruments for its satisfaction. In this way, one is glad to reflect, the sordid, broken, dirty, worthless objects one sees children playing with in surroundings of prosaic squalor are clothed with functional value and subserve the magnificent dreams which make childhood, and perhaps life itself, tolerable. In this way, too, one can understand the childish lie, which is not due to a desire to deceive, and which does not spring from deception, but which is a propositional formulation of something which is needed as truth for the purposes of the moment, and its correspondence with the facts of the case is not inquired into.

The same theory of accentuated subjective influence in perception is used to account for certain phenomena of primitive mentality, so far as it can be inferred. It appears that very primitive peoples invest any strange phenomena

with "power," they see it as the abode of supernatural force, impersonal, dangerous and contagious. From this projection of their emotions has developed personal deities who ride the storm, inhabit the streams and live in the hearts of trees. The point of the suggested interpretation is that they, like children, perceive subjectively—they perceive force, they do not infer it to be there.

From what has been said it is clear that although it is important to distinguish the image from the perception as an experience, there is nevertheless a strong imaginal factor playing a part in all our percepts, which is the more dominant the less developed we are.

Night dreams.—Night dreams are a subject of special interest. The simplest view of the matter is that the waking consciousness is no longer there to guide the thoughts and imagery of the sleeper, and that his mind therefore "wanders." No wonder a dream is incoherent and ridiculous because there is no energy at hand which makes for coherence and sense. This view is similar to those which regard mental abnormality as being merely a sign that the organism is not working as it should.

A great deal of experimentation has been done to discover whether the dream is ever connected with stimulations which are occurring during the night. Maury found that the content of the dream was influenced by tactile stimulation: a man had his lips and nose tickled with a feather and dreamed that he had a mask of pitch on his face which was then removed and pulled his skin with it.

Vold and Cubberley used sticking plaster and tape bandages to modify dream content. Hildebrandt used alarm clocks and sometimes the dream was of church bells, and sometimes of the smashing of plates. The story of the dream of the guillotine and the factual falling of the bed-rail is well known as an instance of the mysterious relation between dream-time and "real" time. Internal disturbances, too, exert determinative influences: they sometimes affect the content, *e.g.* dreaming of flying connected with breathing peculiarities, and they sometimes seem to

afford occasion for dreaming, or at least for such light sleeping that dreams are easily remembered.

There is, in fact, no doubt that stimulation, both external and internal, have an effect on dreams, but we cannot rest content with this discovery. We still want to know why the content is this rather than that; we want to know why an alarm clock sometimes appears as church bells and sometimes as the smashing of crockery.

The greatest contribution to the answering of this question is that made by Freud (9). Convinced of the meaningfulness of all mental phenomena, he traces the *manifest dream content* to unconscious interests, and analyses the dream as the precipitation of wishes and repressions which can only effect the mangled representation of their true nature because of the forces of repression themselves. He uses the convenient picture of a "censor" who only allows a transmuted version of the real state of affairs to pass into consciousness. Some interest has been touched on during the past forty-eight hours which cannot achieve direct expression, and this interest again is so important because of the infantile interests with which it is connected. The expression will be distorted, elements will carry more than one meaning (condensation), and sometimes, in the course of one night, the same theme may weave itself different clothing corresponding to the different layers of repression which are involved.

Since the same problems tend to crop up from person to person there is a certain similarity in symbolism from one dream to another where the same interests are concerned, but no dream can be completely understood unless one treats it as a piece of imaginative expression peculiar to the dreamer.

Occasionally a dream may be a direct "wish-fulfilment," but this is comparatively rare, except with young children and psychotics.

There is, however, one type of dream which gives rise to a special difficulty: the dream which is the repetition of some painful situation. Here there is no distortion,

and the function of the dream to preserve sleep is often not performed. To meet with such cases Freud pictures these dreams as being the manifestation of a "repetition-compulsion," the business of which is to help the organism to master a real experience which had been insuperable when it actually occurred.

Since the dream is manufactured by the unconscious, it is no wonder that when the conscious forces return to control the dream is often forgotten, or that when it is related it is often "rationalised" to make it more plausible.

Jung, as might be supposed, is not satisfied to trace the dream to its source; he also wants to consider whither the dream is pointing. A young man brought him a dream about his father who was driving a car in a reckless way and eventually damaged it. The dreamer tried to stop him but without avail, and when the accident took place his father only laughed and the dreamer saw that he was drunk (10, p. 22). Jung analyses this dream as an attempt on the part of the young man's unconsciousness to depreciate his father because he (the dreamer) was living too much under his father's influence: "His father is still too much the guarantor of his existence, and he is still living what I call a provisional life." The dream, here, is interpreted as an indication of coming disaster and that, for Jung, is its principal function.

It must not be thought that experimentation has been abandoned by psychologists who interpret dreams in terms of unconscious motivation. Shrötter discovered that when a hypnotised person was told to dream of sexual activities, the symbols which are employed are those familiar to psycho-analysts from other sources, thereby helping to confirm their interpretations, and Silberer performed a series of experiments on himself in order to find out how abstract ideas clothe themselves with visual imagery (11).

In recent years a startling theory has been put forward by Dunne (12). He collected a number of dreams and found that in many cases there was a strange connection between the content of the dream and a subsequent event.

Naturally one is at a loss to discover how this could come about, and yet the evidence is certainly not negligible. Dunne has attempted to invent a theory of time which renders it possible for us to see into the future, because of different rates at which time moves. The problem is made more difficult because one has no means of calculating the relevant probabilities which allow of, or rule out, the hypothesis of coincidence. If I dream of a horse, and see one next day, my dream may have been " broken " but no one will be very surprised; if I dream that a ship has gone down, and if in my dream there are certain distinctive details, and if I read a few days later that the ship has really gone down to the accompaniment of details similar to those in my dream, I may be surprised and feel that coincidence will not meet the case.

(1) Myers. Textbook of Experimental Psychology.
(2) Woodworth. Psychology. A Study of Mental Life.
(3) Koffka. Principles of Gestalt Psychology.
(4) Frank. Psychologische Forschung, 4, p. 33.
(5) Jaensch. Eidetic Imagery.
(6) Allport. British Journal of Psychology, XV, p. 88.
(7) Bartlett. Remembering.
(8) Stout. Manual of Psychology, 4th ed.
(9) Freud. Interpretation of Dreams.
(10) Jung. Modern Man in Search of a Soul.
(11) Freud. New Introductory Lectures.
(12) Dunn. An Experiment with Time.

CHAPTER XIX.

MEMORY.

THE words " memory " and " remember " are ambiguous. They refer to a variety of performances which have only one thing in common : the action of the past on the present. For this reason it is of the utmost importance to distinguish the various ways in which the past operates, because any theory of "mnemic causality" must account for all " mnemic phenomena," and so far no satisfactory theory has been put forward.

Let us first consider the most important ways in which we use past experience :

(1) *Implicit memory, or habit memory.*—We are able to write, drive a motor car, speak and knit because we have learnt how. We do not refer to the past explicitly, we carry the past with us, as it were, and it is as though we were ourselves changed organisms with respect to the trick we have learnt, and therefore act differently now from the way we should have acted before the change took place. Little will be said about this form of memory in so far as it is responsible for the overt habits we form in the course of our practical lives, because it has already been discussed in Chapter IV. We shall, however, deal in this chapter with a special class of implicit memory undertakings which have to do with verbal performance—learning poetry, vocabularies, etc.

(2) *Pure memory.*—The remembering of actual incidents in our past lives.

(3) *Recognition.*

(4) *Memory of ideas.*—More often than not we remember the gist of a conversation or of a book rather than the actual

words in which the information was conveyed. This is concerned with understanding and thought and those subjects are discussed in Chapter XXI, and no more will be said about this form of memory here, than to call attention to its difference from the other three forms.

The difference between these four ways in which the past operates may be seen if we take a simple example. Suppose a student to be faced with a question in an examination paper ; the question is concerned with matters that are familiar to him, he *recognises* the words, in virtue partly of his having learnt to read. His answer might be an achievement in rote memory (*implicit memory*), he might have learnt by heart an answer and simply write down what he has learnt in that way. He might, on the other hand, have a memory image of a classroom in which a lecturer was giving a lecture on the subject, and hear the lecture all over again and take down what the lecturer says. Another thing which may happen, however, is that he may remember the gist of what he has read or heard on the subject and compose an answer from that. Of course the most likely thing to happen is that he will use all forms of memory in making up his answer : scraps of habitual expression will occur to him, memories of relevant experiences will crop up, and remembered ideas will come into his mind, clothed in different language from that in which they were originally expressed.

(5) To these four ways in which the past affects the present we must add a fifth. We use the word " recognition " in cases in which the familiarity is explicit, but we must not forget that such instances merge with the more frequent occurrence in everyday life of so deeply " embedded " an " acquired meaning " that the recognition is rather implicit than explicit. We certainly do recognise our friends and our houses, but when we meet them often we do not have the experience, " I have seen that face before " ; whatever there is about us which enables us to recognise familiar objects manifests itself in varying degrees of overtness.

There must, however, be something about us in virtue of which we can perform this feat of recognition, and therefore we may say that the organism is in a certain condition *now*, because of past happenings, which determines the effect that stimuli will have on it.

" *Temporal units.*"—Now there is a special instance of this condition of the organism influencing the effect of stimulation to which Koffka (1, pp. 431-451) devotes careful attention. When we hear a tune, or a series of taps, the successive notes of the tune and the successive taps in the rhythm are perceived as belonging to the ones that have gone before. This is more than the mere general capacity to recognise the taps as taps, and the notes as notes of a certain instrument, there is an intimate connection between whatever is left behind (if anything) by the previous notes and taps and the ones which come after.

Koffka has a theory of traces in nervous tissue, and he believes that the traces of the previous taps and notes form a trace system which must be thought of as a whole and which has certain dynamic forces within it which, as it were, attract towards it suitable results of stimulation. Not every result of stimulation will get drawn in and integrated into the system ; if that were the case the motor horn in the street would find its way into the symphony ; there are rules (*e.g.* principle of likeness) according to which the trace will select suitable stimulation-effects and the conscious awareness will then be significantly altered. It will be seen that the system of trace tensions is only a special case of the neural configurations which the " Gestalt " school believe to be correlated with perception, and, indeed, all behaviour.

Pure memory.—We may remember by means of images or words or a combination of the two. The importance from a theoretical point of view of the fact that we can remember in verbal form is obvious : if memory were merely the re-having of an experience it is difficult to see how the words could function as a vehicle unless we were to have described the experience as we had it, which is not a

plausible suggestion, and in any case we can describe the same remembered event sometimes with one set of words and sometimes with another.

Validity.—We sometimes remember things that never happened to us. There is the often-quoted case of George IV. who remembered that he was at the Battle of Waterloo, and there are cases from time to time of people who remember that they have committed crimes which they actually have not committed at all. It looks as though the memory-form were to a certain extent at the disposal of the organism if, for some reason, it is useful to it. It is true that a memory may come into our minds by " pure association ": we smell lavender and have a memory image of a garden we have seen on a particular occasion, but for the most part our memory images come into our minds in the service of some tendency which is operating at the moment, and which is helped by a reference to the past of this nature. Now it may be that under special circumstances we can, as it were, manufacture a memory to suit our convenience. This is sometimes observable when we have told a complicated lie and find ourselves imperceptibly being drawn into a belief that what we have said was really true. Since the motives of the lie are conscious and we know what we are at, it is rare for the process of memory-manufacture to be carried through to completion; what usually happens is that we know on reflection that what we have said to be the case was not the case, but when we are not reflecting we may catch ourselves " half-believing " that it was. Now it may be the case that the false memories referred to above are manufactured by the organism for the embodiment in everyday life of unconscious desires. If, because of internal complications, a man has an unconscious desire to be punished, one of the ways of satisfying his desire would be to give himself up for having committed a crime. If he knew what he wanted, he might pretend that he had committed the crime, but since he does not know what he wants, some part of him has to create the memory that he has committed the

crime in order to induce his conscious self to take steps to bring about punishment. We shall see (p. 404) that man moves consciously in a rational ambience, and when he does anything he is not comfortable unless he can make it plausible, and therefore the invention of " false memories " is in the interests of rationalisation.

There is a temptation to use these false memories to impugn the validity of memory altogether, but we must notice that a false memory is only known to be false if we accept certain memories as being true. That our knowledge of the past is more complicated than would appear at first sight is brought to our notice when we reflect on those frequent occasions on which we have a memory, either an image or a set of words, and know that what really happened was not quite like that, but cannot remember exactly that is wrong or what ought to be added. If memory were merely the re-excitation of traces, it is not easy to see how we could know that some of the re-excitations were not as they should be. And if they are not as they should be, how is it, on a trace theory, that they are as they are ?

Recognition.—There are various levels of recognising : we may recognise an object as a man, an Englishman, an Englishman who lives in our village, or as Mr. X. At low levels it is immediate and such is all recognition proper, but sometimes we may " recognise " after a process of associating : the sight of a person may serve as the cue for his name to appear in our minds and *then* we recognise him as Mr. X., whereas before the name came to us he was a " man we ought to know " and not, experientially speaking, Mr. X. at all.

The main condition for recognition is that there should have been one or more presentations in the past of the recognised object. If, however, we have been shown a number of objects, *e.g.* pictures, and then have them presented again but mixed up with a number of other objects like them in irregular order, we are liable to make mistakes (2, p. 106). This means that for high-level recognition

something more than bare presentation may be required; distinguishing features have to be noticed, differences have to be marked, and sometimes several presentations are required. What we notice is partly determined by our interests, including the interest in observation *per se*, so that if we have no special interest we may well be unable to, say, recognise one Chinaman from a group of Chinamen, or one sheep out of a flock, but to a Chinaman who may have practical interests at stake in recognising his fellow-countrymen one from another, the presentation of a group of Chinamen is a more highly articulated affair than it is to a person who has not the same interests. The same may be said of the shepherd when he looks at a flock he has charge of; he can recognise one sheep from another in a group which looks to the casual observer a mere collection of bleating similars.

Besides the pre-conditions of interest and observation, the situation in which the material is presented for recognition is important. It is not enough for the material to be there, it must stand out from its background, or, negatively, it must not be absorbed into its background. Köhler's apes could not recognise a stick when it was a branch of a tree, and a bird which had learnt to get food from under a pot could "recognise" the pot when it stood out from a collection of similar pots, but could not recognise it when it formed part of a pattern of similar pots, such as a circle of them or a straight line of them (3, p. 121).

In Koffka's "Principles of Gestalt Psychology," p. 156, will be found pictures of patterns in which figures are incorporated which, in isolation, had been presented to subjects, but which they were unable to recognise when they were absorbed in the larger whole.

The importance of the environment of the item to be recognised is illustrated by the fact that we may be unable to recognise a familiar face under a new hat or above a different suit of clothes, and we are very properly advised that the best way to hide something is to put it in a place in which it will merge into the totality that surrounds it.

Dejà-vu.—It sometimes happens that a place or a person is falsely recognised. The person feels that he has read a book before, seen a person before or been in a place before, though he knows that it is not the case. McCurdy (4) suggests that the presentation has aroused a memory, which, because of its association with repressed tendencies, cannot come into consciousness, so that all that can "come through" is a feeling of familiarity, which properly belongs to the aroused memory, but attaches itself to the presentation.

Of course, cases of "false recognition" are also interpreted in terms of re-incarnation, but scientific parsimony makes us uncomfortable in the presence of such an exorbitant hypothesis.

Implicit memory of verbal material.—Considerable amount of work has been done in psychological laboratories on the remembering of material that has been learnt by heart, and in the following pages we shall be concerned with the main points which have been made in this connection as a result of investigation. Much of what will be said applies to memory of ideas, and some will apply to memory of past events, but it is all lumped under this heading because the same principles often apply to all three forms of memory, and because from a practical point of view it is often unnecessary to draw the distinction between rote memory and memory of ideas. It is historically important to note that in the past nearly all the experiments on "memory" were performed with the use of nonsense syllables, because it was argued that if we are going to experiment on memory we ought to aim at a performance which is unadulterated by such factors as interest, knowledge and emotion. This adherence to the scientific principle that you must isolate your material if you are going to study it with advantage is characteristic of an age which was determined to derive human behaviour from a few elements related by such external relations as the "associative tie," but nowadays we realise that such a hope is illusory, and that memory is not a faculty which works independently of the rest of the organism, but is rather a mode of behaviour which involves the

whole of the organism. This means that emotion and interest are likely to play an all-important part in our remembering as they do in other pieces of behaviour, and that on this account we cannot apply what we learn when the material arouses no interest whatever and the emotion of boredom alone, to what will happen when we are interested in the material, bring our understandings to bear on it, and want to learn for other reasons than because it is a laboratory task.

When we turn to an analysis of the memory performance we find that it can be divided into three stages: A. The learning experience or original perceptions; B. the retention; C. the recall, and we shall discover that our capacity to recall is influenced by circumstances which bear on each of these three parts.

A. The Learning.

(1) *Material: Meaningless* v. *meaningful material.*—Fewer repetitions are required for meaningful material than for meaningless material: *e.g.* Lyon found that about 6 repetitions were required to learn about 60 words of poetry. Ebbinghouse found that about 55 repetitions were required to learn 36 nonsense syllables. In general one can say that wholes which are easily apprehended (and meaning is a whole-making cement) require fewer repetitions than wholes which are less easily apprehended. The relations between the parts of the material which has to be learnt, other than the mere relation of "after," are of paramount importance.

Length of material.—The number of repetitions required for one learning varies with the length of the material: *e.g.* 1 rep. for 7, 16 reps. for 12, 30 for 16, 44 for 24, and 55 for 36 (6, p. 148).

These figures are only typical averages and not absolute. The point is that with nonsense syllables more than twice the time is required to learn more than twice the amount. This is not the case with meaningful material: *e.g.* Lyon (7) found 6 reps. for 60 words, 15 for 150, 17·5 for 300, 19 for

750, 26·5 for 1500. It looks as though we tried to weld the nonsense syllables into a whole, which is harder to do the longer the series, while the meaningful series is already a whole in virtue of its meaningfulness.

Position of material in the series.—In a series of nonsense syllables incompletely learnt, the earlier and final members of the series are liable to be remembered while the middle members are not.

Subsidiary associations.—We may note here that there is evidence that in learning a series on nonsense syllables some kind of connection is made between remote members of the series as well as between consecutive members. Again there are signs that the series is operating as a whole (6, p. 154 ff.).

Environment of material. Retroactive inhibition.—" There is," says Myers (6, p. 153), " reason to believe that the act of forming one association c-d, just after the formation as another association a-b, inhibits the latter." The inhibiting effect is inversely proportional to the interval between the tasks, and also inversely proportional to the time elapsing between the learning and the recall. The inhibiting material must be of the same nature as the material inhibited, and, as we should expect, the effect is much less pronounced when the material is meaningful.

Myers mentions a singular phenomenon (6, p. 156): " When a syllable ' a,' which has been already firmly associated with a syllable ' b,' is presented with ' c,' the association ' a-b ' is strengthened." This is sometimes known as the " Müller-Schumann law." It is apparently difficult to unpick an association and link up the associates with something else.

On the " meaningless " atomic theory of memory it is difficult to see why there is this difference between learning nonsense syllables and learning meaningful material. After all the items make their trace, and there is no provision for an *internal* relation of meaningfulness between the items which form a meaningful series which is absent in a series composed of nonsense syllables. If, however, the trace

system left by reading a series of nonsense syllables, and that left after reading a piece of sensible material behaved differently because of the different configurational characteristics which each of them had, then it might be that a trace left by homogeneous material would be less well articulated and therefore less stable than that left by the meaningful material. This is the opinion of Restorff (8).

"Restorff," writes Koffka, "has proved that . . . their homogeneity and not, as previously thought, their nonsense character, is chiefly responsible for their refractoriness, and that the effect of the homogeneity results from processes in the traces, the formation of larger trace systems in which the individual traces become absorbed and lose their individuality" (1, p. 483).

Feeling-tone.—Preferred material is more easily learnt than material of the same class which is not preferred. With respect to the hedonic tone of experiences which are remembered by memory of events, it would appear that if they are going to be remembered at all as many pleasant ones are remembered as unpleasant ones. Unfortunately Freud gave the impression that he believed that unpleasant experiences tend to be forgotten; every one cried out that they constantly remembered unpleasant things that had happened to them, and Wohlgemuth (9) carried out an experiment to show that children do not tend to remember only the pleasant things that have happened to them on a holiday, but are just as likely to remember the unpleasant ones as well. What survives of the principle is that when there is reason to expect that a memory or a piece of information might be forthcoming, and we find that it is not accessible, it may be connected with some desire or interest whose expression is inhibited, and that if it were to come into the mind it would be attended by an unpleasant emotional tone of anxiety; this is often misleadingly expressed by saying that we do not remember in order to avoid the unpleasantness. In any case it is the unpleasantness accompanying the *remembering* that is the key to the situation, and not the unpleasantness of the experience remembered.

It is, however, further true that there is in most of us a tendency to forget to do unpleasant things, such as post cheques or seek embarrassing interviews : the technique of banishing from the conscious mind of activities which conflict with other desires (keeping one's money and being on pleasant terms with other people) is not confined to the " censorship " of unconscious interests.

Mode of apprehension.—Verbalisation. We have seen that figures can be taken in various ways, and when figures presented for remembering are " taken as " representations of objects or geometrical forms, the reproductions which are made in the recall situation are influenced by the judgment which has been made of the presentations. On the whole, when judgment enters in, the reproductions are more like the judgment which is made than like the original : *e.g.* if a figure is taken to be an anchor, the reproduction will be anchor-like, while if the same figure were taken to be a spade, the reproduction will be more like a spade (10).

(2) *Methods of learning.*

Spacing.—Considerable research has revealed that fewer repetitions are required for the learning of material if they are spread out at intervals, than are required when they are all done at the same time : *e.g.* Lyon (7) found that the time taken to learn 24 nonsense syllables was reduced from 16 minutes (massed repetitions) to 5 minutes when the repetitions were spaced at the rate of 1 repetition per day.

With meaningful material, however, the position is not quite so simple ; there would appear to be an optimal interval between repetitions which varies from person to person and from material to material. *E.g.* Lyon found that to learn 125 words of poetry 10 massed repetitions and 5 repetitions at 1 per day were required, but 450 words required 30 massed repetitions and 46 at 1 per day. The interval has, of course, an upper limit which must not be exceeded. It is suggested that the optimal interval leaves time for " consolidation," and that the influence of some

refractory period in nervous processes is thereby avoided. It is fairly clear that the advantage of spaced repetition is *not* due to the avoidance of fatigue. It has also been suggested that material learnt with spaced repetitions lasts longer with respect to its substance—the ideas which it conveys—than material learnt by massed repetitions.

Whole or part method.—In learning a passage, should we split it up into parts and learn these, or should we learn the whole at once by whole-wise repetitions ?

The results of experimental research are contradictory, but the ranges of advantage and disadvantage are so small that one is inclined to say that it depends on the person and the material. Woodworth (2, p. 86) has analysed the pros and cons. He points out that the factor of confidence, getting something done, is in favour of the " part " method ; the principle that you tend to remember what you have recently read is in favour of the part method, because when you get back to the beginning of the *part* it is fresh in your mind ; meaning and the general establishment of long-distance relationships is in favour of the " whole " method. The emotional factor will vary with persons, and the " meaning " factor will vary with the material.

Recitation.—It is found that more is remembered if part of the learning time is spent in recitation—saying over to oneself with correction where necessary, than if the whole time is given up to repetition. *E.g.* in some experiments conducted by Gates (5), it was found that when the whole time (9 minutes) was given up to reading 16 nonsense syllables 35 per cent. was remembered, when 2/5 of the time was given to recitation 54 per cent. was remembered, and when 4/5 of the time was devoted to recitation 74 per cent was remembered. The improvement with meaningful material was less significant.

It is not strange that recitation should help, because what we are learning is the performance of reciting and not the performance of reading, and therefore practice in reciting would be expected to be an aid to the repetition in the recall situation.

Mnemonic techniques.—If you are learning a series of nonsense syllables you try to note any adventitious connections between them, such as rhyming, conjoining to make up a sensible word, or combining into a rhythmic whole.

If you are learning a list of pairs of words which have no obvious connection between them, you invent a connection —usually comic, *e.g.* a person might remember cauliflower-*choufleur* by means of a picture of hens being shooed off a cauliflower.

In such cases we see the " whole-making " activity of the intelligence at work ; it is as though if we want to digest a piece of information we shall absorb it better if it is made digestible by being made intelligible, and linked up with the furniture of thoughts, pictures, interests and habitual phrases with which we have already furnished our minds. This is of importance to advertisers and the inventors of trade names ; the more meaningless the less " digestible " (11, p. 682).

A method of remembering numbers consists of taking some structure which has already been absorbed, and is part of our apparatus, such as the alphabet, and pairing off digits with letters. Then a telephone number can be translated into a series of letters, which can be read as a word and the meaning of the word connected into a story with the name of the person whose telephone number it is.

Again, if you want to remember the name of a person, you might elaborate his name into a meaning and link it up in story form with the appearance of the person.

Woodworth remarks : " Some speakers, in planning out a speech, locate each successive point in a corner of the room, or in a room of their own house : and when they have finished one point, look into the next corner, or think of the next room, and find the following point there " (2, p. 119).

Of course all these techniques are liable to go wrong : you may forget your story, or you may forget the key to your mnemonic framework, but they are all attempts which we spontaneously make, and may consciously elaborate, to render meaningful, and therefore acceptable, material which

on the face of it has nothing to bind it together save bare association.

It is interesting to notice, but so far impossible to explain, the force of the comic in this connection. It would be interesting to know whether any one ever makes up tragic stories or sad associations instead of funny ones.

The will to learn.—It is not enough to rely on bare awareness of material to be learnt. For success in learning the intention to learn must be present. Woodworth refers to a case in which a foreign student in a Swiss laboratory was shown a list of nonsense syllables, and when asked to recite them was unable to do so. When it was explained what was expected of him he exclaimed, " Oh, I didn't understand that I was to learn them " (2, p. 88).

Uncompleted tasks.—We have remarked elsewhere on the resumption of uncompleted tasks (*cf.* p. 29). This is of importance to the Gestalt school, because it is conveniently explained by saying that the state of tension is striving towards equilibrium, and that we resume an unfinished task in order to be " shut " of it, or, more correctly, the task tends to complete itself. Similarly Lewin and Zeigarnik (12) find that uncompleted tasks are better remembered than completed ones ; again there is evidence that a state of tension persists rendering the unfinished tasks more accessible to memory. In England Pachauri has investigated the same problem (13).

The middle stage of the memory performance (B) is a blank to us. The actual apprehension of the material is something of which we are aware, and which we can study systematically, and the recalling of the material is open to direct inspection but the period in between is dark so far as the relevant matter is concerned.

We have seen how difficult it is to locate the " memories " in the nervous system, but because we think spacially we must use spatial language and speak of them as somewhere. Our position is this : in experience we have the co-presentation of " a " and " b," then there is a gap, and then we have before us something very like " a " and that is followed by

our remembering "b," whether "b" is an event or an isolated nonsense syllable or a telephone number or a series of meaningful or meaningless material, in any case the cue is given and the response is made. This makes us say that "a" and "b" are "associated" and we think of the association as a link or bond or cement which persistently connects the associates when we are not remembering, and which is "strong" if we remember a great deal and "weak" if we remember little. It is important to bear in mind that all we know is that if we have certain experiences at time t_1 we shall be able to do something at time t_2. All speculation as to what is happening between these times is a matter of inference in any case, and may be a matter of linguistic convenience. We must not allow our linguistic facility to lure us into the belief that we have explained anything when we say that we have established an associative bond between "a" and "b." This does not mean that we must not speculate, but it does mean that we must be aware of what we are doing.

Curve of forgetting.—Suppose you have learnt something in, say, 20 repetitions, and after a few days only require 8 repetitions to re-learn the same material, it is argued that *some* trace or other has been left by your past learning, because time in re-learning is "saved" (saving method of investigation). By experimenting along these lines it could be found out how much "saving" was possible after various intervals, and a curve could be drawn correlating the lapse of time after the original learning with the amount that the evidence of saving made us suppose to have persisted. Ebbinghaus (14) is responsible for a standard curve of forgetting. In a set of experiments referred to by Myers (6, p. 152), the curve falls rapidly, at first indicating that only about 35 per cent. saving was effected after about 8 hours, then it slowly declines and after 6 days sufficient trace was still left to produce about 25 per cent. saving. Such figures are, of course, only typical of one form of material and one form of recall. An experiment performed by Luh (15) revealed different curves for different methods of testing the

liveliness of the trace: recognition, reconstruction of ideas, reproduction, and saving.

Everyday experience shows us that the ideas transmitted by a meaningful piece of material in which we are interested do not fade with the rapidity of nonsense syllables.

Reminiscence.—The experiments of Ballard disclosed that among children the power of recall does not always fade gradually away. In some cases they were able to recall more after an interval of a few days than they could immediately after learning. This phenomenon is called "reminiscence," and so far no satisfactory explanation has been found for it.

Alteration.—In trying to guess what happens during the retentive period (B), we compare the recalled material with the learnt material. When they are the same we say that a trace has been left by the latter which is revived in the former. When less is recalled than was originally learnt, we say that part of the trace has been obliterated, or that something is inhibiting the recall. There are cases, however, in which what is recalled is different from what has been learnt. For a careful study of this situation we are indebted to Bartlett (16). He made his subjects read stories and reproduce what they had read by giving the gist of it. General reproductions were made by each person at different intervals, and he noticed that there were certain characteristics, other than mere incompleteness, which distinguished the reproductions from the originals.

The subjects seemed to get a general impression of the story and reproduced it in much the same form from one reproduction to another; the reproductions were frequently more "sensible" than the originals, and sometimes bore traces of special interests (*e.g.* in anthropology, the stories being folk tales); certain outstanding details managed to persist. The differences between the originals and the reproductions is so striking that Bartlett insists on the importance of the creative element in memory. We do not have a string of items linked one to another, which come out one after another like beads on a chain, it is truer to say that we have a general impression (or "schema") which

develops its details, or which we feel as though we were filling in. Sometimes the general blurr with which we start, when some one asks us to give an account of a book, is marked by a few outstanding details, and we seem to weave the story round them as fixtures in the plan to which we must keep.

Similar experiments were performed by Bartlett on drawings, and somewhat similar investigations have been carried out by Wulff (17), Allport (18) and Gibson, to whose work we have already referred (p. 346).

The upshot of these experiments is that the reproductions of figures differ from the originals in certain systematic ways. There are observable: (*a*) tendencies towards making the reproduction more like a familiar form; (*b*) tendencies towards symmetry; (*c*) tendencies towards "sharpening" or "pointing" (Wulff), *i.e.* exaggerating outstanding features; (*d*) reduction in size (Allport); (*e*) "levelling" or toning down of outstanding features. Of course not all these factors can be seen at work in the same picture, in fact some of them are opposed to one another; apart from the first, the tendency towards familiarity, there seem to be two broad themes: the tendency to simplify, and the tendency to articulate. Such alterations are, according to the "Gestalt" school, due to internal dynamic factors in the traces: a trace will try to "shake down" into the most stable form, and this may mean reduction of articulation or an emphasis of it. Which it will be will depend on the nature of the configuration set up in the perception of the original: some forms are more stable than others, and the trace systems carry on the configural patterns of perception; they will retain the dynamic stresses which are involved in all "figure-background" relationships, and these stresses will work their way towards stability, with the result that, when aroused for the purposes of reproduction, the re-activated trace-system is in a different state of tension and the resulting reproduction will therefore be different from the original.

Besides this, succeeding traces may modify existing ones.

According to Koffka this may account for the strange fact that when a house or a street has been altered it is difficult to remember what it looked like before the alteration (1, p. 524).

Testimony.—The creative nature of remembering is of vital importance here. Numbers of experiments have been performed on the reliability of testimony: a scene is enacted before subjects who are unaware of its import and believe it to be " real "; they are then asked to give an account of what has happened. Their different personalities have influenced what they have seen, and when they are asked to reproduce what has occurred they have to reconstruct a plausible story out of a general hazy notion of the situation as a whole. It is not a matter of surprise, therefore, that witnesses frequently give conflicting evidence, nor that they can be induced to reconstruct their own reconstruction by a skilful examiner.

When we are being cross-examined on any subject, we are in a particular social situation, in which a reply has to be found to the questions we are asked. Since the reply has to fit in with the implications of the question, a memory may well be manufactured to help us perform the task required of us, *viz.* to fill the gap indicated by the questioner. People vary with respect to the fixity of their memories on such occasions; some people are more occupied in meeting the situation and invent suitable memories for doing so, others have a firm belief of their own which cannot be shaken, and of these there is a class who are determined by the situation, like the first group, but in a " negative " way, *i.e.* they " refuse " to remember anything expected of them.

" *Serial reproductions.*"—One of the most remarkable things that emerged from experiments conducted by Bartlett on " serial reproduction," the reproduction by one subject of the reproduction of another, and so forth, was the fact that the series, whether pictures or stories, produced by several people in this way, displayed the same features as were observable in the successive reproductions

of single subjects at different times. This may throw a light on the problem of rumour.

C. Recall.

Recognition.—We have already seen that certain conditions have to be fulfilled in the re-presentation of the material if it is to be recognised. Furthermore, there are certain states of mind of the recogniser which predispose him to recognition: an image or description in his mind of what he is looking for, a desire to find this or that which implies the presence of a tendency seeking satisfaction: *e.g.* a detective might enter a public-house for the purpose of having a drink and not recognise a man who happens to be there at the same time, but if he goes into the same place in order to see whether a suspect, whom he has seen once before, is there, he might recognise the man because he is looking for him. What we perceive always has a recognitive element, and what we perceive is always partly determined by our purposes. This does not mean that all cases of recognition are cases in which there is a purpose at work; there are plenty of cases in which the environment throws a presentation in our way and we recognise it as so and so, but there are cases in which our purposes do determine what we shall recognise.

Reproduction.—It is becoming clear to us now that the conditions of the recall situation are of the greatest importance for mnemonic efficiency. When material has been learnt for reproduction the sufficient cue may be the command to repeat or it may be necessary to "prompt," and when a piece of material has been learnt as a whole, it may be necessary to start at the beginning in order to reach a line or word in the middle; in such a case the repetitive habit has become welded into a unity which cannot be broken up.

Sometimes more complicated conditions are required. When we are in a classroom we may be able to remember more about psychology or history or whatever may be our subject than we can on a summer holiday. If we are asked

how to get from one place to another we may not be able to remember, but if we are placed in circumstances under which we have to make the journey we may be able to remember the way perfectly well. Again, when we are in a foreign country we may be able to speak more of the language than we can when we are at home.

Under abnormal conditions accessibility may be reduced or increased. There are cases in which a patient suffering from aphasia cannot say certain words on the request of the doctor, but can utter those same words when it is " natural " for him to use them. Reduction of accessibility of past experiences occurs in hysterical maladies and in connection with hypnosis (post-hypnotic amnesia). Under the last-named condition, however, there is an increase in accessibility so that more can be remembered than is the case under normal conditions. From all this we can conclude that if an organism cannot do what we expect it to be able to do we cannot say for certain that it has lost the requisite memories because we cannot tell what an organism can do unless we take into consideration the circumstances in which it is placed, which means that if an organism fails to make a response under one set of circumstances it does not follow that it would fail to make that response under all circumstances.

Association.—It is customary to use the word " association " in connection with the action of the past on the present, and in view of what we have said about the conditions of recall we must revise the old-fashioned notions and see whether there is any room left for association in our picture. In the first place we must point out a distinction between " association of ideas " and " association of words " : when we say that the idea of communism is associated in people's minds with the idea of fascism, we do not necessarily mean that when they use one particular set of words they will use another, it means that the one idea, however expressed, will be associated with the other idea, however expressed. When, on the other hand, we say that " eggs " are associated with " bacon " we may mean that the word " eggs " will be

followed by the word " bacon." It is true that in a given instance you may have association of ideas as well as association of words, but this is not necessarily the case.

Besides this ambiguity, we have to note another distinction of usage. We may say that we " associate " all the material connected with a certain subject together—words and ideas—(Herbart's " apperceptive masses "), and that in virtue of this " association," when we are thinking of a certain subject ideas and words connected with that subject are peculiarly accessible. We might picture a kind of cloud of ideas and words connected with, say, chemistry, which loomed up at the back of our minds when we were talking about chemical matters, and which has been formed by experience—reading, lectures, conversations, etc. Here, there is no reference to any order in the ideas and words, they are all thought of as jumbled up together, ready for use, and the order in which they will come into the mind is determined by the exigencies of the moment.

Another use of the word refers to the actual next-doorness of ideas or words as they come into the mind. Thus we should say that " eggs " are " associated " with " bacon " because they have been frequently " associated " in the past. This " association by contiguity " as it is called has been held to account for all the sequences of ideas and words that occur in the mind, save such as are put down to " association by similarity," which is regarded as being just as mechanical a principle. We shall discuss the shortcomings of such a view in the chapter on thought, but here we may ask whether we ever do " associate " in a mechanical way. The answer, I think, is that we do. There are, as it were, two interacting levels of human thought processes—the habit or mechanical level and the reflective or control level. Just as we recognise objects presented " by chance " to us without having any purpose in view, just as we perform several acts mechanically " out of sheer habit," so one idea can drag another after it, or one word be followed by another word on a basis of pure " association," *i.e.* simply because they have been frequently co-presented in the past, or on a

basis of similarity. Indeed we often find that a piece of thinking is made to go astray because of a " chance association," and on the other hand, it may conceivably happen that a practical application of past experience, in which the material is ordered by the " determining tendency " of the moment, might be assisted by a chance association. It must be emphasised that the notion of an associative tendency, and the notion of a directive tendency dependent on the situation in which the organism happens to find itself, are abstractions. What usually happens is that the train of thought draws on the " associated ideas," and displays them in rational and relevant order, while here and there an habitual conjunction will make its appearance based on pure association, and sometimes the whole trend of the thought will be given a characteristic twist by the " purely associative " connection between one idea and another. People notoriously differ from person to person and from time to time in the extent to which the order of their thoughts is due to " association " and the extent it is due to the consideration of a problem which has to be solved, or a story which has to be told.

Improvement of memory.—If the general position taken up in this discussion is correct, that interest and purpose dominate over " pure association," and if we add the other principle which loomed up when we discussed the treatment of material in learning, the tendency of the mind to deal in wholes, then we can see that in order to improve our memories we can attack either end of the process in the following ways :

(1) By linking the material up with the maximum number of interests, we render the material more accessible.

(2) By elaborating the relations between the items to be remembered, we render the material more manageable because more orderly.

(3) By making the material more spontaneously interesting, we help to make it more easily ordered and also more accessible because it is connected with deep-seated, rather than artificial, interests. This will mean that it

will be incorporated into wholes which are likely to be brought to the surface during the ordinary activities of everyday life.

These three pieces of advice are concerned with the first stage of the memory process, and aim at increasing the range of the situations that will recall the material.

Whether we can improve retentiveness itself is very difficult to say. Nearly all the evidence, which is produced as showing a transfer of memory capacity from practice in one material to the memorising of another is in favour of the development of technique in learning, interest in memorising *per se*, ideals of observation, etc., and little, if any, improvement can be put down to increased capacity to retain.

From what has been said, it will be obvious that the phrase " a good memory " refers not to a retentive memory so much as to a capacity to recall the maximum amount of relevant material at the suitable time. What a person retains and does not recall is as unknown as it is useless, and what a person recalls at the " wrong " moment is as useless as it is irritating; what we want is that our minds should be neat as well as well-stocked.

Is obliviscence absolute?—Since the circumstances which enable us to recall are so important, it has been asked whether anything ever fades away beyond recall. Is all forgetting a matter of unfavourable recall situations? The question cannot be answered. We know that abnormal circumstances (hypnosis, etc.) enormously increase the memory range, and we can therefore say that under appropriate circumstances we might be able to recall everything that has ever happened to us, everything we have ever read, and everything that we have ever heard. It seems unplausible to suppose that somewhere lurk the numbers of all our hotel bedrooms, and all the nonsense syllables we have ever learnt, and the simplest view is that such material of purely temporary importance may get obliterated for ever, but it is safer to concentrate on the fact that it is certainly inaccessible than to speculate on its fate.

Individual and age differences.—James believed that there is an ultimate difference between people's retentive capacity. Whether this is a matter of their ability to arrange material or of the conditions necessary for recall, or of their actual retentive powers, it is impossible to say, but certainly, quite apart from abnormal restrictions, people do vary in the degree of accessibility of their memories.

Common experience also reveals varying accessibility of material learnt at different ages. It looks as though material learnt by rote in childhood remained accessible longer than material learnt by rote at later ages. If this is really true there is a good argument for making children learn series of what may be to them almost nonsense in order that they will have useful lists to refer to when they grow up. After all it is nearly always those who know the dates of the kings and queens by heart, and who as a matter of fact are glad of the information, who condemn such rote memory as old-fashioned and intellectually contemptible. Actually life is often made more interesting if we have such schemata at our disposal.

(1) Koffka. Principles of Gestalt Psychology.
(2) Woodworth. Psychology. A Study of Mental Life.
(3) Köhler. Gestalt Psychology.
(4) McCurdy. Psychology of Emotion.
(5) Gates. Recitation as a Factor in Memorizing.
(6) Myers. Textbook of Experimental Psychology.
(7) Lyon. Journal of Educ. Psychology, V.
(8) Von Restorff. Psychologische Forschung, 18, p. 299.
(9) Wohlgemuth. British Journal of Psychology, XIII, p. 405.
(10) Gibson. Journal of Experimental Psychology. 1929, p. 1.
(11) Starch. Principles of Advertising.
(12) Zeigarnik. Psychologische Forschung, 9, p. 1.
(13) Pachauri. British Journal of Psychology, XXV, p. 265 and p. 4, and XXVII, p. 170.
(14) Ebbinghaus. On Memory.
(15) Luh. Psychological Monograph. 1922, no. 142.
(16) Bartlett. Remembering.
(17) Wulff. Psychologische Forschung, 1, p. 333.
(18) Allport. British Journal of Psychology, XXI, p. 133.

CHAPTER XX.

BELIEF.

JUST as we distinguish between an actual performance and the disposition to act in that way, or an actual remembering and "memory," so we must distinguish between an actual experience of believing (or doubting or disbelieving) and our "beliefs."

In all these cases, the first members of the pairs are occurrences, and the second constructs, which we invent for the purpose of understanding, explaining, codifying and predicting the content of the first.

In an experience of believing, we consciously have before us a proposition, or an organisation of propositions and a belief-feeling somehow related to it. We obviously have to add the belief-feeling, because it is possible for us to apprehend a proposition without believing, or doubting, or disbelieving it. And, further, if we were to develop a theory of what is "really" happening, to the effect that belief comes about when certain forces are, say, in equilibrium, and doubt, when they are in a certain state of disequilibrium, and disbelief, when they are in another state of disequilibrium, we should not have "explained away" belief as an experience, we should merely be alleging certain causes or conditions for its presentation.

Beliefs.—A person's beliefs are an imaginary compilation of propositions with respect to any of which we predict that, if presented with it, he will have a feeling of belief, or disbelief towards it. For convenience sake we picture this corpus of beliefs as a system, which is constantly being added to and subtracted from, and we shall presently attempt to

disentangle some of the factors which are responsible for its contents.

The contents themselves are various: scientific beliefs, magical beliefs, religious beliefs, and so on. On the fringe of the system of beliefs, and closely associated with it, is a group of propositions which we may call "doubts"; these are propositions with respect to which one sits on the fence; it is not that they are merely apprehended, but rather that they are regarded with a positive feeling of doubt when they are mentioned. The condition for this state of mind is that one should have before one a proposition, round which hovers a cloud of argument for and against; it arises from too much "knowledge" rather than from too little. The size of this anomalous group partly depends on the temperament of the subject: some people are believers by nature, and some doubting Thomases.

Factors determining belief.—We can divide the factors determining belief into two groups: (1) *specific factors*, which have to do with the occasion of the believing, and (2) *general factors*, which have to do with the disposition of the believer. This, like all classification in psychology, is purely a matter of convenience, and we must bear in mind that the specific and general factors interact in every instance.

Specific Factors.

(1) *Content of belief.*—That one proposition rather than another should be presented obviously depends on a variety of circumstances: external (the turn of conversation, the problem in hand, "association," etc.) and internal (a tendency to "harp on certain subjects," the interests aroused, past experience, knowledge, etc.).

(2) *Temporary framework.*—When we are reading a novel, we enter a system which has a structure of its own, more or less dependent on our beliefs of everyday life, but involving a suspension of our "reality-principle" to some extent. We believe in the existence of the characters, their peculiarities, the places in which they live, the words they utter

and so forth. When such a temporary framework is particularly satisfying for some reason, we may even write books about the fictitious characters as if they were real people: e.g. Sherlock Holmes.

(3) *Personal relations.*—When we have certain feelings of admiration, respect, dislike, contempt, etc., towards the utterer or writer of a proposition, our belief is likely to be influenced by this fact. We are prone to accept what we are told by people who impress us, and we are liable to reject what is told us by people whom we dislike or condemn. Of course, these tendencies are only *tendencies* and nothing more; we accept and reject much in opposition to them, but they certainly have some influence from time to time.

(4) *Medium.*—The medium in which propositions are conveyed may be of importance. It is, again, impossible to generalise, but experience shows that the same proposition meets with a different reception according to whether it is read or heard.

(5) *Desire.*—On the whole there is a tendency to believe whatever fits in with the satisfaction of the desires aroused at the moment.

(6) *Accordance with beliefs.*—A proposition is likely to be accepted if it is seen to be in accordance with the corpus of already accepted beliefs, and rejected if it is seen to be in disaccord with that corpus. This is so obvious that one is liable to forget it, and yet this factor, seeing that a proposition is in accord (or disaccord) involves the great unsolved problem of psychology—the reason. Is the "seeing" something which really determines the acceptation? Or is it simply the phenomenal representative of a *de facto* acceptance, due to a relation between what is going on when we apprehend the proposition, and whatever is *in situ* as the (? neural) representative of the relevant "beliefs." We talk in terms of the first hypothesis, but physiological psychologists bid us hope for a solution in accord with the latter, so that we can dismiss the awkward independent observing faculty.

(7) *Spontaneous belief.*—It has been held that belief is the "natural" response to a proposition in the absence of

relevant beliefs. This, as we observed above, seem rather to be a matter of temperament.

(8) Evidence is forthcoming that nitrous oxide and ether have a powerful influence on the belief feeling (1, p. 387).

(9) *Pathology.*—In some cases of mental disturbance we find that the patient is paralysed by a "*folie de doute*"; this is not so much an intellectual malady, as one which prevents action, and one can regard the inability to accept certain propositions as a technique for avoiding acting on them.

General Factors Influencing Belief.

(1) *Experience.*—The reality of the behavioural world is given us in perception, and any proposition which, as it were, congeals into words the evidence of our senses is believed. This is true, not only of what is presented to us, at any moment, but also of propositions about the past. Belief is implicit in memory-contents, as well as in descriptions of what we have before us as sense-data.

The bare description of the present and the past, however, does not make up much of what is presented to us for belief, or rejection. The evidence of our senses deserves to be put among our beliefs, because if we were called upon to face propositions which claim to describe it, we should assent or dissent, even though in practice this seldom happens.

(2) *Inference.*—We add to our corpus of beliefs by inference. From a proposition or a set of propositions in which we believe, we pass over the bridge of "therefore" to a new proposition or set of propositions which we "see" to follow from the ones we started with, and which we now apprehend believingly. The most striking of such passages are those whose form is studied under the heading of "Deductive Logic." Here we seem necessitated to accept the conclusion, granted that we accept the premises, and so impressed are we by this feeling of compulsion, that special theories have to be constructed in order to account for it: *e.g.* we are so made that we perceive those rules, which all possible worlds must obey, with special clarity: or we and

the world are built on the same plan, and therefore we have a special feeling when the structural principles of the world and ourselves are exemplified: or, we have this feeling of obviousness because we are merely repeating ourselves in other words when we deduce a conclusion from the premises (logical positivism).

But besides increasing our stock of beliefs by deduction, we increase it still more by induction. We do not always formulate propositions and then generalise, we sometimes generalise direct from experience. An instance or two make us formulate a general principle, however weak its value may be when we reflect on it in a critical mood.

Another source of beliefs is the inference to an hypothesis. We create structures of the world, or of part of it, in order to fit the items of observation into orderly patterns. We see that if a certain structure really corresponds to what is the case, then such and such an event will happen, and the more our expectations are verified, the more firmly our hypothesis will become embedded in our corpus of beliefs.

This whole field is usually neglected by psychologists, for the good reason that there is very little to say about it, but if we are going to attempt to draw a picture of human beings, it is obviously scandalous to omit processes which occupy a considerable amount of their time.

A very curious feature of beliefs which are dominated by the factors we are now considering is this: in practical life we add generalisations to our beliefs and jump at explanatory hypotheses on evidence which reflection makes us deplore. On reflection, however, we see that generalisations and theories have only probability value, and that if Newton can be superseded, Copernicus may be the next to go. Doubt reigns where certainty was, and a new system, a thinner system, of beliefs replaces the luxuriant ones which we have examined and rejected. The biological trend of modern psychology makes us look on the beliefs which are connected with practical life, as more "real" than those which grow in the more rarefied atmosphere of philosophic reflection, while the philosopher is apt to look pityingly upon the hasty inferences

of everyday as evidence of human weakness, which it is our business to overcome.

The psychologist obviously has to take account of both activities, quite apart from any question of validity ; he must recognise the fact that a man may be doubtful about the existence of the furniture in his room, when he is not there to perceive it, and when he is philosophising, while when he is not philosophising, he may believe that the furniture is just as he left it. The two states of mind are equally "real," and we shall have to fit the philosophising into our ultimate system just as much as we have to fit the believing which goes on in ordinary circumstances.

Non-Rational factors.—Side by side with beliefs concerning the nature of the behavioural world, there are a number of beliefs which present a special difficulty. Their content transcends human experience, and is frequently contradicted by it. Many religious beliefs and popular superstitions are of this order. They are of enormous interest to the psychologist because, even if they fail to pass the test of reflective examination, or at least find no argumentative support from that quarter, they are nevertheless held with undiminished fervour, and when they are called into question, the people who hold them are apt to display the emotions of anger, regret, sorrow, and general disapproval. We cannot help feeling that non-rational factors are at work, and that something other than reason is being satisfied by their acceptation.

From other sources we learn that unsatisfied and repressed desire find a modicum of satisfaction in imaginary construction : day-dreams, night-dreams and the like, and the psychoanalysts suggest that many religious beliefs and popular superstitions are held because of the satisfaction they afford to these unconscious impulses, and that we are angry when such beliefs are questioned because we are afraid of losing the relief they bring.

The significance of belief in the Virgin Birth, the Fatherhood of God, and the forgiveness of sins is obvious in this connection.

But if the source of many beliefs lies in the satisfaction they afford, and if the expression of rage when these beliefs are questioned is a sign of this, we must overhaul " scientific " belief with these ideas in our minds. When we do so, we are startled to find that anger is not unknown in that field as well. The rage expressed by some scientists against such hypotheses as human survival, the inheritance of acquired characteristics, vitalism, and even the existence of mental events as distinct from physiological ones, cannot fail to arouse our suspicion, and, with it, our curiosity. What, for example, is the emotional satisfaction of " materialism " ? The Jungian framework suggests a possible answer : if one side of our natures is over-developed, the other side clamours for expression, and the side which is dominant looks askance at anything which smacks of its rival. In the West, we have over-developed that side of our natures which is concerned with the manipulation of matter, we are absorbed in moving matter from one place to another, making machines and controlling the forces of nature, but there may be another side which is not developed and of which the practical outward-turned side is afraid. Belief in the existence of minds unaccompanied by bodies may be associated with the undeveloped side of our natures, and when we contemplate it our over-developed " materialistic " selves may feel outraged and insecure.

Such considerations as these should make us examine our " cherished " beliefs in a new light.

There is another curious feature of our beliefs, which is allied to the one we have just been considering, and that is that certain " explanations " are more satisfying than others, in a sense that we cannot attribute to the action of reason. We have, as we shall see, certain experiences which we consider valuable and important, and we like an explanation of such experiences which is dignified, and resent one which is felt to be undignified. When it is suggested that works of art are the products of the sexual desire seeking for substitute satisfaction, a great many people are angry, and go so far as to say that " beauty has been explained away."

Similarly, it does not redound to the dignity of the human mind to say that we could find out all about it if we knew enough about the workings of the nervous system, and people seem to think that the human mind would suddenly feel quite different if that hypothesis were established. This means that we are apt to be " choosey " about the materials we are going to use for explanatory purposes, when it comes to things which we think highly of ; presumably we do not value water highly enough to mind the hypothesis that it is composed of oxygen and hydrogen mixed in certain proportions.

Social factors.—We have depicted the individual as pulled out of his individualistic path by the forces of the societies to which he belongs, and one of the places where this pull is felt is the field of belief. We not only tend to act in conformity with our fellows, but to believe what they believe as well, and one of the sources of resistance to change in belief is the dislike group-members have to innovation.

Economic factors.—Of recent years an interesting theory has gained ground to the effect that our position with respect to a certain aspect of social organisation determines our beliefs. Societies are held to develop in accordance with a certain pattern, the keynote of which is the possession of the means of production. When a certain group within a society has control over the means of production, the rest are exploited because only by working for the owners can they produce anything for themselves.

The owners are so anxious to accumulate power and property, that the free circulation of goods is hampered ; the employed are exasperated by their unfavourable position, and when this is made intolerable by the clogging of the economic machine, they seize the means of production into their own hands.

Under the new régime, however, the same thing will happen all over again, and therefore you will always have a class in power and a class exploited, and the desire to keep their position will influence the beliefs of the former, while

the desire to improve their position will influence the beliefs of the latter.

This " dialectical " framework has been of great use in interpreting historical changes, and undoubtedly our position in society has a very powerful unconscious effect on what we believe, particularly in matters of politics and economic theory. It is obviously a convenience to people who are in a position from which they do not wish to be dislodged that they should believe that economic theory indicates that the structure of society would be altered for the worse if they were removed from the scene ; if they have got their position by the efforts of themselves or their family, they will be liable to accept a doctrine which supports private enterprise.

The social factors operative in making us believe the things we do believe have been examined by several modern sociologists (*e.g.* Max Weber, Pareto). Mannheim (2), for example, has analysed the different ways in which different groups develop different styles of thinking about historical development : one group will have no sense of gradual development, but will look on the course of history as having been determined by a series of seizures of power on the part of the strong ; another, the Conservative, will see the present as representing the best that can be done in the present state of affairs, having regard to the course of development which cannot be altered and which is always as good as it can be ; another group, the Liberals, will think of time as an empty plain stretching out in front which can be filled in satisfactorily if man will only use his brains ; the Socialist-Communist has a sense of historical development, but condemns the present, because its only value is that it carries in it the seeds of an inevitable and better future. The result is that vitalistic theories to the effect that the life-force pushes us on from one perfection to another, or theories to the effect that time is an illusion, will please the Conservative type of mind because they sanctify the present, while an analysis of the past which gives an indication of how the future is likely to develop will

please the Socialist-Communist because it confirms him in his hope that the present will give way to a state of affairs that will release him from bondage.

Furthermore, any doctrine that is current in one party will for that reason be detestable to another.

These theories of social determination are particularly important at the present time, because they help us to understand differences of opinion, and cause us to be more modest in our claims. They are also important because of the light they throw on the beliefs which have been current in past ages ; when we see the heat of controversy raging about us on political matters, we can have some insight into what the ancients must have felt when they quarrelled about matters which seem to us of minute importance ; what matters to-day is politics, economics and individualism, what mattered yesterday was Arianism, Nestorianism, and direct access : the rage, and the accompanying distortions have been suitably transferred.

Belief and action.—If we take up the biological standpoint, we can picture an organism with its needs, facing an environment. This environment elicits responses, the organism seeks satisfaction and self-expression, and under favourable circumstances the two fit like hand and glove. Now whether animals live the hand-to-mouth existence that the stimulus-response picture implies, it is impossible for us to say, but human beings certainly do not. For adult human beings the environment at any moment is not merely what is actually present in terms of stimulus, it is rather a part of the whole universe in which he believes. He perceives the corn as having been planted, the fire as likely to burn him, the sun as setting and eventually to rise again, and, in some cases, he sees in playing-cards the lures of the deveil, theatre tickets as passports to Hell, and churches as the palaces of God. Of course such ideas are not present before his mind, but in some sense they form a background to his existence.

We must remember that we are partly responsible for what the behavioural world looks like ; the world in which we live is the resultant of the clash between us and the geographical

world, and it is the creation of the whole of us: as we live we precipitate it.

Some of this background of belief is shaped by memory of what has happened either to us or to other people, and some of it is derived from unconscious sources, but from whatever source the ingredients come, the situations in which we act are seen in terms of it.

When people say that action and belief go hand in hand, it is to this totality of presentation and acceptation to which they refer. Action implies belief in the sense that if we believed otherwise we should act otherwise, and on this level of practical life, belief is almost always silent, and only comes to overt believing when questions are asked, or when a hitch in the intercourse between ourselves and the environment occurs.

We still have the same picture: organism and environment, but now the environment is complicated; it is a projection evolved from us by the geographical stimulation of our natures.

Now, however, we have to pass to the first addition to our system—the addition of beliefs with which action does not accord. The religious believer is constantly taunted by the sceptic because he does not act up to his beliefs, and the man who believes that his fate for eternity depends on the way he comports himself terrestrially does not always take the pains we should expect if he "really" believed what he says he believes. It is obviously a mistake to suppose that the beliefs in accordance with which we do not act are less "real" than those in accordance with which we do. The position is that we are believing creatures, and satisfy our needs in a world drenched with belief; when the world does not offer us the apparatus for satisfying our desires, either because the social world makes us repress them, or because the content of our desires is made up of infantile imaginings which do not tally with what the world has to offer, or for both reasons, we believingly project constructs whose function it is to satisfy us, and make up for the deficiencies of the "real" world. Just as the child may say

that which is untrue if it fits in with the scheme of his play, so we believe in that for which there is no evidence because a believed-in object is necessary for the satisfaction of our desires.

The next addition to our belief system borders on the practical world, but transcends it. What is the practical import of a belief that the universe is " really " four-dimensional ? Here again we have a set of beliefs, which, from the point of view of action, are luxuries, but there is an important difference between these and the emotional luxuries spoken of above : the former are tied to experience in a way in which the latter are not, and they seem to be subject to the control of what we call " the eye of reason," or " insight." We see that this is plausible and that is not, and " reason " compels us to accept this and reject that. Here, once more, we are up against the problem of the nature of the " reason."

Of course these three groups of beliefs, practical, emotional and scientific, are to be regarded as formal compartments. What each will contain depends on the person who owns the beliefs. The belief in a life after death is for one person a practical belief, for another an emotional belief, and for a third a scientific belief ; there is no place allotted for this belief or that, the question is : how does it function in this man's system ?

Value.—We not only live in a world of things about which we hold practical and scientific beliefs, we live in a world which contains value.

From a phenomenological point of view good and bad, beauty and ugliness reside in the behavioural world as objectively as tables and chairs. Just as the physicist, who believes in the reality of electrons, or the mentalist who disbelieves in the reality of matter both behave " normally " towards their dinner and tea, so the ethical subjectivist, who disbelieves in the objectivity of good, may be a stern moralist and apprehend some acts as good and others as bad. Speculation on the subject is a luxury which makes but little difference to behaviour.

At the outset, two courses can be taken : either we believe

in some extra intuitive power, which really perceives what is really there, or we regard ethical judgments as projections of personal feelings of approval and disapproval, and then seek the cause of such feelings.

If the first course be taken, there is no more for the psychologist to say, except to fit the moral " eye " into his scheme.

As may be imagined, this is not a popular view with psychologists, and a variety of theories have been put forward to account for the feelings of disapproval and approval which arise in our minds.

(1) Value is said to have something to do with successful working or living, (*a*) on the part of the organism, or (*b*) on the part of the community.

The former of these views has but little to recommend it, but for the latter there is something to be said. The morality of the primitive tribe is tribal: people who do not belong to the tribe are not regarded as having any rights, and the conventions of the community are the moral rules of the members of that community. This view helps to explain the variety of different moral codes, which we find when we examine those which differ from our own. In places where the old and infirm are liable to be a drag on the community, it is the right and proper thing to put the aged to death and to expose the children so that only the strong shall survive. The difficulty is that there seem to be moral rules which transcend tribal requirements, and which, if put into operation, might even militate against tribal welfare. On these grounds, Bergson admits of two sources of morality: the tribal source, and some source which is of a more general nature, in fact, the " élan vital," itself.

(2) For the Freudian psychologist, morals concern the super-ego. We have developed a relatively segregated system of controlling forces from the prohibitions and commands of our parents, backed up by imaginary threats of loss of love and fantasied dangers, into which we shall run if we do not obey their behests. Our impulses have to be in accord with this system if they are to be allowed

manifestation. If there is no friction, no judgment need be passed; if there is an element of friction somewhere, so that the impulse has to overcome resistance, and if it is in accord with the super-ego, so that the super-ego has to insist on its performance, then the act in question is considered "good." If, however, it is in disaccord with the super-ego, it is judged "bad," and guilt will be felt if it is performed because of the fear of punishment which lurks behind the super-ego's judgment. When people have a very rigid super-ego, because of their own natures, and because of the experiences which they have passed through, they will be preoccupied with the problem of morals, and alarmed at every step because of the symbolic connection between an act which may be quite innocent in itself, and other activities against which the super-ego has announced severe prohibitions. The acts of others will be criticised on the basis of the impulses which contemplation of them sets going in ourselves.

Such a picture is very useful. It makes us understand why people differ in severity, and why they inveigh against different objectives, but it only tells us how any one person's moral vision is derived; it does not give us very general information. Of course the alleged social disadvantages of sexual licence, combined with the theory of symbolism, to the effect that something which, in itself neutral, may stand for something else of a sexual nature, help us to understand a great deal of the content of moral judgments, but even if we write off a great deal of morality as "sexual morality," there is a great deal left to be accounted for.

(3) *Mental evolution.*—There are a variety of theories which attempt to explain morality in terms of mental alteration. In its early stages of development feeling of approval and disapproval will doubtless be experienced, and moral judgments will be made in accordance with such feelings, but as time goes on, the human mind changes, and the later moral judgments will differ in content from the earlier ones. The direction of such changes in moral outlook is the subject of the study of comparative morals, but the writers on

this matter frequently introduce the tacit assumption that the moral outlook of a later time is more valid than the moral outlook of an earlier time, which of course, leaves the criterion by which they are to be judged, still to be explained.

Æsthetics.—In this field, again, we ask : is there a special eye, which perceives beauty and ugliness, *i.e.* a special æsthetic sense, or are the ejaculations "beautiful !", "ugly !" manifestations of certain states in themselves not æsthetic ?

Lipps has suggested that the beauty of architecture is a projection of our own total condition, as we "feel ourselves into" the objects we contemplate : the doctrine of "*Einfühlung*" or "empathy."

I. A. Richards (3) holds that æsthetic values are a measure of the amount of our impulsive nature that is satisfied by the contemplation of a work of art.

The "Gestalt" psychologists have an easy account of æsthetics in terms of the balance of "good" or "bad" organisations.

The Freudian school point out that much of the delight in the matter presented lies in the satisfaction it affords to our unconscious desires, which find release of tension in the contemplation of situations which mirror their own predicaments.

All these views remind us that the cause of our enjoyment, when we look at pictures, hear music, read books and poetry, must be exceedingly complex. But among them we seem to distinguish one all-important factor : the perception of form. Certainly it seems plausible to derive this from the nature of the processes which go on inside us, and it is reasonable to suppose that the approval of one form, and the disapproval of another are determined by certain standards of equilibrium of processes which the contemplation of works of art are set going.

(1) James. Varieties of Religious Experience.
(2) Mannheim. Idiology and Utopia.
(3) Richards. - Principles of Literary Criticism.

CHAPTER XXI.

THINKING.

WE have now to consider the great psychological problem: what determines the one-after-another-ness in the mind, with respect of a special class of happening which we call "thought"?

The processes which go on in the outside world, and those that go on in our bodies (hunger, thirst, sexual disturbance, etc.) are responsible for a considerable amount of mental content. Such processes may be pictured as obeying laws of their own and impinging on our minds when circumstances permit. But what about our thoughts? What sort of framework must we use if we want to fit thinking into our scheme?

Association.—We have already mentioned "association by contiguity" and we have found that when several items are related in the unity of an attentional field, either side-by-side, or one after another, the representation of one is likely to give rise to the thinking about some of the others. We must here recall the distinction between "association" of words and association of ideas. If the whole phrase "with your leave or by your leave" has been apprehended, learnt, and is part of the armory of verbalisation, it is difficult to say "with your leave" without adding the other words, though it would hardly be true to say that we are associating two ideas. When the emotionally toned noises "communist" or "fascist" are apprehended, there need be no words that will always follow, but there may be ideas, "dictatorship," "wickedness" or "solution of the world-

problem," which are similar from time to time in content, but couched in different verbiage on different occasions.

Lewin (1) performed an interesting series of experiments on the " strength " of associations. He made his subjects learn pairs of nonsense syllables so that when presented with one they would answer with the other ; side by side with this learning, he made them learn to read nonsense syllables backwards, so that when they saw " kuf " they had to say " fuk." He then constructed a test series of nonsense syllables that had not been presented before, and among them he introduced syllables which had been learnt as the first of a pair in the first learning series. The order is given to turn the syllables round backwards. What will happen when they come to a syllable which has been learnt with an associate ?

There " ought " to be conflict between the associate and the backwards version of the presented syllable, and this ought to manifest itself in the length of reaction-time.

No such thing was detected. And when there was a lag in the reaction-time for the critical syllable, it seemed to be due to an impulse on the part of the subject to identify something he felt to be vaguely familiar.

The upshot of this experiment is to confirm Ach's theory that if there is a " determining tendency " at work, it tends to check irrelevant associates.

But what would happen if the mind were made a "blank" ? Surely the associate would come into the mind if the first of a pair were presented. But this, again, did not happen with any regularity. When the subjects were told to answer with the first thing that came into their heads, and were then presented with a series of nonsense syllables, it frequently happened that nothing in particular came into their heads at all, and because they knew that they had to say something, they often determined to answer by rhyming, or turning the syllable round backwards, and they treated the first of a pair just as they had treated the others : *i.e.* either nothing came into their mind, and they were embarrassed, or what did come into their minds was not the second of the pair,

but something which rhymed with the presented syllable, or was its reversed version.

This looks as though the learning of associated pairs, itself, involved a " determining tendency " when the correct associates *were* reproduced, namely, the " tendency to respond with the second of a pair that I have learnt."

It would be hazardous to deny all force to pure association, but this experiment, and, for a matter of that, the experience of everyday life, show that its strength is far less than some psychologists have supposed.

Word-to-word association.—If you are told to answer the first word that comes into your head, when you hear a stimulus word, what makes you answer as you do? A considerable number of associations of this kind can be put down to verbal habits: bacon—eggs, black—white, etc., but verbal habits will not account for them all.

Investigators have gone through lists of associated words, and have classified the associations in terms of the relationship which subsists between the ideas: *e.g.* opposition, part-whole, etc., and a number of such schemes will be found in Warren's " History of the Association Psychology," pp. 247 ff.

From the point of view of psychological theory, such schemes are of little value, because they are concerned with the *logical* rather than the *psychological* connection between the associates. If to the stimulus word " hand," I reply " arm," it is no explanation to say that it is a " part-whole " association; I may know a public-house called the " Hand and Arm," or I may have an image of an arm, and, because I know that I have to say something, I name the thing I have an image of.

The schemes, however, are not entirely without value. They bring out an important point. We do notice relationships of " opposite " and " part-whole " and so forth, and supposing we picture a person's knowledge as though it could be looked at all at once, we might imagine his ideas arranged in an organised way; it would not, we believe, be arranged entirely in the form of verbal association though

much of it would be, but the idea of, say " white " would be observed as related in one way to " colour " and in another way to " black," and so on. Of course such a picture is quite fantastic, but some such organisation must be imagined to account for a great deal of non-verbal association. It must be admitted, however, that it is so far impossible to say why a person replies on a basis of one logical relation rather than another, why, that is to say, in a given instance, a person replies: " colour " to the stimulus word " white," and on another occasion " black."

Besides verbal and " logical " associations, there are associations based on " past experience " ; *e.g.* " Kipling " might be replied to " If." Again we cannot say, except in certain cases where the experiences have been frequent and (or) recent, and (or) exclusive, why one associate comes into the mind rather than another one, which, so far as experience goes, is equally possible. To say that there must be an easier passage from the apprehension of the stimulus word to the replying with the word that was actually replied that to the replying with any other word, is a hypothesis which explains nothing.

Lastly there are certain words that have a special " meaning " for the subject because they are associated with some special interest, and therefore the association has an emotional basis. If the interest is repressed, the association-time is likely to be lengthened, and the associate-word is likely to be rather unusual. Because of this, it has been found that " free association " experiments of the kind we are considering are often helpful in the detection of repressed material, and have been used by Jung for that purpose.

Serial association.—Instead of having to answer with a word to a stimulus word, a subject may be required to let his mind ramble round an idea. This method of " free association " is used by psychoanalysts for the discovery of the sorts of ideas that are associated together in the minds of their patients. The theory that lies behind this practice is that the basis of connection in such ramblings is emotional, or " tendentious," and that if the mind is

allowed, as it were, to free-wheel, the doctor, and eventually the patient himself, may see the significance of the course which it takes.

Now the kind of interests which the psychoanalyst is after are the unconscious ones, and therefore the patient is warned that he must say everything that comes into his mind, and that he must particularly avoid paying attention to the minatory influence of his critical faculties; he must not mind saying anything that is "shameful," absurd, irrelevant, or rude, because the things that are criticised in that way are often precisely the things that have to be said, and afford important information about the unconscious "lay-out" of the patient.

The stimuli that are used to start the ball rolling are taken from dreams, or from symptoms which the patient displays, or from any ideas that seem to pre-occupy him.

Constrained association.—This is a form of association which is of the word-to-word character, but the reply is "constrained" by a "determining tendency" which is accepted at the beginning.

A subject is told that to the words which will be read to him he must answer in terms of some logical relation or other; *e.g.* he may be told to give the "whole" of which the stimulus word stands for the "part" or he has to give the "opposite" of the stimulus word.

The great reduction of the reaction-time in these experiments bears witness to the orderly way in which we store our "knowledge." What we reply here depends on the "set" of our minds to respond in terms of a scheme of relationships. "The selective influence of the mental set is exerted before recall; it facilitates the right recall and inhibits the recall of any but the right response" (2, p. 432).

Association by similarity.—The word "association" is ambiguous. It means (1) a principle which predisposes us to respond one way rather than another, and (2) the fact of responding one word, or a set of words, on the apprehension of a stimulus. Thus, in what are called "association experiments," we may use the word "association" both in the

explanatory and in the descriptive sense: (1) a past association, or co-presentation, may account for our giving the word we do give in response to the stimulus, and (2) we are giving an associate word when we respond, whether it is based on association in the first sense or not.

From an explanatory point of view there is another basis of "association," and that is "association by similarity." This means that when one thing comes into our minds it may be followed by something else because the something else is, in some respect, similar to the first.

Attempts have been made in the past to reduce association by similarity to "association by contiguity." It is held that when "a" and "b" have been co-presented, the representation of "a" will be followed by the thought of "b"; this is, as we have seen above, the principle of association by contiguity. Now when we have a complex, a b c d e, before us, and then think of the complex p q r s t, which is similar to it in form, it was said that the latter complex must have contained an element, say "b," which was present in the former, so that we are mistaken in analysing the second complex into p q r s t, because it really should be p q r *b* s t. This comes into our minds because of the "b" which is presented in a b c d e, and therefore arouses its former companions to activity: p . q r s t.

This is, of course, quite contrary to the observed facts; a photograph makes us think of the original, one tune makes us think of another which is like it, and so forth, without our being able to point to any material constituent common to both, and the suggestion that there must be a common factor is pure invention.

In looks, in fact, as though we were faced with an ultimate feature of mental life: that when we have apprehended a configuration we are likely to think of it again when we apprehend another configuration which has some of the same configural qualities. The "Gestalt" psychologists are not surprised at this, because, as we have seen, they believe that we perceive by configurations, and are therefore quite prepared to say that when the nervous system is configured in

a certain way, the trace which is left is of a configural character, and that there may be a rule in accordance with which configurations tend to arouse their similars.

Actually we can turn the tables on the above argument, by saying that association by contiguity is based on association by similarity. After all it is on a basis of the " similarity " of " a " to the " a " originally perceived with " b " that " b " comes into our minds. If I have heard Clara Butt sing " Abide with me," it is true that when I hear the same tune played on a harmonium I may think of the famous contralto, and that this is because she was contiguously associated in the past with that tune, but when the idea comes into my mind on the re-presentation of the tune, it is because of the *similarity* between the tune played on the harmonium and the tune I heard her sing.

The close connection between similars is of the greatest importance for symbolism. We have seen that when an interest is repressed the repressive ban may fall on everything that is connected with that interest, and many of the things that get connected with repressed interests are associated with them on a basis of similarity. Furthermore, when a repressed interest manages to achieve some form of expression, the form which the expression takes is frequently a " symbolic " representation of the desire, and objects will have a special interest for the person who has a repressed desire because they symbolise something, on a basis of similarity, *e.g.* of shape, which he is forbidden to contemplate in itself.

Thought.—So far we have merely been attempting to clear the way for one of the most difficult problems of psychology. We have used the verb " to think of " in a very general sense, to stand for the coming into the mind of any idea or image or word, and we have seen that there are at least five tendencies at work determining what we shall think of next : (1) pure association, (2) association by similarity, (3) the " set " of the mind artificially produced by the command of the experimenter, (4) special interest in certain connections in the past, (5) some special interest at the present. Of these the

last two are of paramount importance. Our interests largely determine what we shall apprehend together, and what form the togetherness will take, *i.e.* what relations we shall apprehend as holding between the presented items. Our interests and desires link items together because of their connection with those interests and desires, rather than because of mere co-presentation. Besides this, our interests of the moment will play an important part, as we shall see below, in determining what shall come into our minds at any given time.

But do our ideas always follow one another higgledy-piggledy on a basis of these determining forces ? Have we not in thought something more than could be analysed into a concatenation of ideas linked together by associative or interest bonds ?

When we let our minds " free-wheel," and thoughts drift through them in a relatively unorganised way, we may admit that the principles we have mentioned above are operative, but when we reason, argue, make a point, construct a thesis, or solve a problem, there is an orderliness about the series of ideas, which we contrast with day-dreaming and wool-gathering. Whatever may be the most convenient way of formulating this in the end, we seem to exert an effort of selection, and the order in which the ideas present themselves is not the temporal or spatial order of those ideas in past experience, nor is it given us by the similarity of one idea to another, nor is it given us by any emotional appeal which links the ideas together ; it is rather an order determined by the inductive principles by means of which we attempt to understand the behavioural world, or by the deductive principles in accordance with which we pass from the acceptance of one idea to the acceptance or rejection of another.

There are, therefore, two important characteristics of thought processes : selection and orderliness, and psychologists have been at pains to invent adequate formulations of the selective principles.

The associationists relied on pure association, with the addition of various rules which accounted for selection in a

mechanical way. Granted that when " a " and " b " are co-apprehended a bond is established between them, we have to admit that any " a " will be associated with a variety of other items. When that " a " is re-presented, what will happen ? One answer given is that the associate which will come next will be determined by the " relative strength " of the associations, which are again, determined by such factors as " recency," " frequency " and emotional disturbance at the time of co-apprehension. No one will doubt that such pure associations as manifest themselves do obey these rules, but it is very doubtful whether even the development of a day-dream can be accounted for in this way, and quite certain that our reasoning processes cannot be put down to such chance associations as these.

In practice, indeed, we are constantly noticing that some people seem to be the victims of association, and that when we are tired our minds wander, but when this happens we say that we and our friends cannot " keep to the point," which means that there is something else which comes in when, in defiance of mechanical associations, we do keep to the point.

It is suggested above that there is selectivity even in day-dreaming. Truth may be abandoned, and we may take little account of likelihood ; we may give ourselves over to " wish-fulfilment," but the story that unfolds itself is a story and not a mere chain of associated ideas. One selective principle is the wish that is being fulfilled in the day-dream, or the tendency (conscious or unconscious) which is being satisfied, but in day-dreaming we may notice degrees of the selective activity of some *ordering* agency.

The juxtaposed items in a surréalist picture derive their significance from the very fact that some ordering agency has suspended its activities and allowed scope for emotionally determined combinations, and the importance of the ordering agency which is *not* operative in these works of art, is seen when we listen to the criticisms which are directed towards such " meaningless " creations. In the state of mind in which most of us look at pictures or read poetry the ordering

activities are awake, and are outraged when they are baulked; one of the most difficult things to do is to suspend whatever "faculty" it is that looks for meaning, story or argument, and submit to the bare apprehension of ideas or images.

What has been said about day-dreams has brought to light a principle of organisation, which may be called the principle of coherence, and we must now recognise it as a factor to take account of, as well as the principle of selection for relevance, and the principles which are analysed in the study of logic. By this principle we mean whatever it is that is responsible for the ordering of material into a story, or ordering material so that the whole fabric is not weighed down by the over-elaboration of one part, or the arrangement of material in such a way as to render it easily apprehended. It may well be decided that this principle is not homogeneous, and that it involves several factors, such as æsthetic taste, sense of balance, knowledge of how people are likely to behave and so forth, and since human beings operate as organisms and not as bundles of insulated faculties, we should expect this to be the case, but in this tangled field we can only advance by making very broad distinctions at first.

The question then is: how can we best cope with these ordering and selective operations? What is it that controls the ideas that come into our minds when we are making up a story, or putting forward a thesis, or arguing a point? What is it that makes us have relevant ideas rather than irrelevant ones? What is it that arranges these ideas in coherent order? What is it that displays the conclusion as following from the evidence, whether it be a generalisation from individual instances, or the application of a general principle?

So far, it must be admitted that psychology has no satisfactory answer to these questions, and many psychologists are wisely content to leave them alone. The answer of unreflective common sense is that we do it ourselves. We picture, none too clearly indeed, a kind of reasoning free agent which has access to the store-cupboard of ideas and chooses the right idea at the right moment. We pride our-

selves on having discovered that the ideas themselves were put into the store-cupboard by an amorphous housekeeper called " Past Experience " (we are going to have no nonsense about innate ideas), but " we " take them out of our own volition. Sometimes, it is true, there is a hitch, an idea is not to be found where we thought it was put, or the ingredients do not happily mix, but linguistic expressions like " I find it difficult to arrange my thoughts," or " He has such an untidy mind " are taken almost at their face value, and the instrumentalist language which we spontaneously use quietly crystallises into theoretic conception.

This is, of course, scientific collapse ; it lands us with an indeterminate agent acting indeterminably.

The psychologists who have attempted to deal with the troublesome problem have, therefore, formulated dynamic and impersonal agencies of which such expressions as " I am arranging my ideas " are the symptom rather than the description.

Ach (3). *Determining tendencies.*—Ach hypnotised a subject and told him that when he was woken up he would be shown two cards, each with two numbers on it ; when he saw the first pair of numbers he was to give their sum, and when he saw the second pair he was to give their difference. Now if you see one number under another, and a line under both, there are several possible associations : the sum, the difference, or the product. In the experiment, when the subject was shown the cards, he answered correctly with the " right " associate and something prevented the " wrong " one from coming up. It was the " determining tendency," this time implanted during hypnosis, and held in readiness until the stimulus should be forthcoming.

In this example the " determining tendency " was artificially created, but normally they " derive from a specific idea of an end and exert a determining force in the direction of or in accordance with this idea " (3, p. 187). He further remarks that this idea of an end need not come into consciousness, but " for all that exerts a determining influence " (p. 224).

This, however, is not much more than a restatement of the problem. Something must control the sequence of ideas, of that we are assured, but what is it ?

Watt (4). *Aufgabe.*—Watt writes as follows : " The reproductive tendencies represent the mechanical factor in thinking, while the problem is what makes it possible that the ideas shall be significantly related."

Driesch, also, in his " Crisis in Psychology," emphasises the importance of " standing under a task," as he calls it (p. 56). According to him, the conscious I *does* nothing, it simply *has* ideas before it, but in an non-conscious X, which he calls " my mind " or " my soul," certain directive forces operate when I " stand under a task " and which cause me to *have* the solution.

The part played by the " Aufgabe " or task is variously conceived by various psychologists. For some the apprehension of the task as being such and such gives rise to certain dynamic activities which lead to its solution, while for others, as we shall see later, the very state of being-in-a-problematic-condition carries with it a tendency towards relief.

Selz (5). When we are " under a task," what happens ? According to Selz the situation itself calls forth an "*Ablaufsform*," a patterned process, which fits it, and which is called forth by it " reflexoidally."

The stimulus may be the determination to perform a task, or the partial completion of a task, or even failure in the course of the performance of a task, and " to every stimulus only one single reaction is correlated " (5, p. 9).

He further elaborates the " reflexoidal patterned response " in intellectual operations by saying that it emerges from a " schematic anticipation of the end," so that the unfolding of a train of thought is of the form of " completion of a complex " (*Komplexergänzung*).

This obviously leaves us in the dark about tasks which we have never faced before. It is all very well for us to have anticipated schemata ready to be called forth " reflexoidally " when a familiar situation presents itself, but what of situations which we are meeting for the first time ?

Wittmann (6), too, agrees that every train of thought, like every train of action, has an "*Ablaufsform*," but for him it derives from a gradually developed way of functioning of the organism. It is not a fixed little tune that we play when the button is pressed ; it is a more fluid affair. When we learn to typewrite, we learn, as has been remarked before, a kind of technique of patterned-wise response, so, in looking at the world, we see parts before us as exhibiting instances of similarity, difference and relevance, and in facing new problems we respond in an orderly way, which depends on our stage of intellectual growth, because we are pattern-making creatures.

Krüger (7) crystallises such liabilities to function in an orderly way into the concept of " structure," which is simply a name given to the ordering principles, which we have to imagine if we are not going to miss one of the most striking characteristics of thought, and of overt behaviour, too, for that matter. But the structures are not isolated abilities or talents, they are to be understood as themselves emerging out of the total organic unity of the organisms which possess them.

Petermann (8) adopts Krüger's structures because you must have some way of referring to the pattern which holds the material of thought in its grip, but he insists on the developmental aspect which is stressed by Wittmann. If you consider a train of thought, you can look at it from two points of view : as an ordered series it is dominated by the " structures " which give it its form, but when you think of it as a piece of behaving, the " structure " is " *au fond* none other than a dynamic happening " (8, p. 168), the characteristics of which will be patterned because organisms behave patternwise, and it will be patterned in a specific way, because the particular organism has acquired certain dispositions (structures) and is " addressing itself " to the problem in a particular way.

Such is one line of attack. Its value lies in the stress laid on the activity of the organism as a whole ; the weight of explanation of the orderly series of thought (and other behaviour) lies in the nature of the person who is doing the thinking.

The main objection to it is that it " explains " nothing. We cannot get behind the structures and view them from another angle. All that is being said is that we think in an orderly way because we have something in us (Structures—Krüger) which have developed during our lifetimes (Wittmann), and which make us think as we do.

Driesch, as we have seen, boldly introduces " my soul," which " is in the possession of order and can make order, for it has faculties of *making* and *doing*, called ' willing ' and ' thinking ' " (9, p. 73). " It is as if I were always standing ' under the task ' of finding *complete order*, and as if my soul were ' solving ' this task " (p. 74).

How far does this differ from the view of unreflective common sense? Not very much. Perhaps unreflective common sense is right after all, but we must turn to another line of thought before we make up our minds.

Koffka.—It is roughly true to say that whereas the centralising theories we have been considering portray us as solving our problems by orderly behaviour, Koffka and his school teach that the problems solve themselves.

When we review the solution of a problem, there are three things to be mentioned: (1) The understanding of the problem and the play of " insight " as the various stages in its solution are reached, (2) the availability of relevant information, and (3) the fitting of the relevant information into the " gap " which the problem, in some sense, is.

(1) Insight is a difficulty. The notion has been introduced (*cf.* p. 100) by Köhler to name the reorganisation of the field which takes place when the function of something in it as a means to the solution of a problem is seen. From the point of view of consciousness it is a distinguishable experience: seeing the point, the " Ah hah ! " experience, understanding the problem as containing hints of its own solution, having a " hunch," etc.; from the point of view of what is " really " happening, however, " insight," says Koffka (10, p. 628), " is not a force which creates solution in a mystical way."

(2) The availability of information depends on the con-

stitution of the organism at the time, and also on the relative " freedom " of the information, in the sense of its not being embedded in a context which has nothing to do with the problem in hand. If something has been learnt in one connection, it may be so tightly bound up with the context in which it was learnt, that it is unavailable for any other. This availability may be decreased by the way in which the problem is apprehended; if we recognise a problem as being of a certain variety, then the material which we can make use of for the solution of problems of that variety may be available, but if a problem is not recognised as belonging to a certain class, then, although the material for its solution may be " there," it is not available. This is the reason why " catch " questions in examination papers often catch out examinees, and it is at the back of a great many " intelligence " problems such as the following: " A ship has a ladder attached to its side, and just resting on the water; the rungs are 1 ft. apart and 3 ins. in diameter; the tide rises 1 ft. per hour; how many rungs will be covered in 3 hours? " The way in which the question is couched may render the information, that the ladder will rise with the ship, unavailable.

(3) The information is useless and even harmful, unless it fits in with the solution pattern. It is here that the descriptive phrase " trial and error " has its value. The understanding of the problem and the available information which we have at the outset limit the " trials " and " errors " we shall make; we shall not try everything we might if pure association were the sole principal operative, but we shall try several things and reject them if they do not lead to the balance of the " solved problem."

But what, it may be asked, lies behind all this? According to Koffka: " The dynamics of the process are determined by the intrinsic properties of the data." His account of thought is exactly the same as his account of perception. We perceive things as we do because the forces of whatever field is involved settle down in a certain way. A person faced with a problem is in a field in a certain state of stress;

in the process of reorganising itself the " field " will " attract towards it relevant information," and the conscious " Ha ! that's right ! " is the counterpart of an achieved state of balance, which, descriptively, is the partial or total solution of the problem. The nature of the stress in the field, and the nature of the field itself, will vary from problem to problem ; sometimes the field is purely intellectual and the shaking down into solution will attract relevant data ; sometimes the field involves a state of stress between the organism and the outside world, and in such cases the interplay of forces in the direction of " closure " will involve a reorganisation of the visual field, a looking for objects, and a series of " insights " into the functional possibilities of the objects as they present themselves. Once again, for the " Gestalt " psychologists, " insight " *does* nothing ; it is the conscious representation of a certain condition of field reorganisation.

This self-solution of problems is obviously attractive, and Koffka presents it to us with a threat : " Either one has to reject the claim that the process was guided by intrinsic relations and explain it by the working of blind mechanisms " (associationism) " . . . or one has to introduce a new factor, a mind, which is able to grasp intrinsic relations and utilise such in its interaction with the body " (10, p. 631).

Trouble may, of course, come from the epistemological quarter. If these problems are really the conscious representations of a state of problematicalness, and if their solution *is* the way they settle down, what guarantee have we that the solution is a true one ?

Whether, however, we are prepared to accept the " Gestalt " view or not, it certainly emphasises the characteristic of order in thought processes.

We are reminded of Titchener's (11, p. 10) report of his method of reading : " As I read an article, or the chapter of a book, I instinctively arrange the facts or arguments in some visual pattern, and I am as likely to think in terms of this pattern as I am to think in words."

Harrower (12), again, brought out the patternedness in reasoning, and like thought processes, by making diagrams

of jokes which were recognised by subjects as being " proper " to the jokes they were meant to represent.

Flach also investigated the possibility of diagrammatising abstract ideas.

But besides these rather special pieces of research into the pattern element in thought processes, we have the well-known theory that problems can solve themselves when we are asleep, or at any rate when we are not doing anything consciously about them. There is the familiar experience that if we are not able to remember a name or a word when we want it, it may come into our minds if we stop thinking about it and trying to find it. The reasons why we cannot think of it are various : we may have suggested to ourselves that we shall not be able to think of it, or some repressed system may have cast its shadow over it, so that the wakeful mind shall not, and therefore does not, see it, but the question still remains : why does it come into our minds later on, when we have ceased trying to remember it ? This is conveniently accounted for if we say that the problem situation perseverated, that forces in us were busily seeking for " closure " or balance, and that when the obstructive factors were in abeyance, the problem was able to solve itself. After all, it frequently happens that the solution, the name or word, comes into our minds long after we have passed on to something else, and are no longer interested consciously in the problem at all.

Graham Wallas, in his " Art of Thought," analyses the formation of thought into four stages : preparation, incubation, illumination and verification. In the first stage, we think of and round the problem and have to do a great deal of hard work ; in the second stage, " we do not voluntarily or consciously think on a particular problem," but " a series of unconscious and involuntary (or fore-conscious and fore-voluntary) mental events may take place " (13, p. 86). In the third stage, the stage of illumination, a solution comes into the mind, sometimes in the form of a feeling, sometimes quite suddenly, which we then proceed to put into shape and verify.

Poincaré (14, p. 54), the famous mathematician, also writes in the same vein : " We might say that the conscious work proved more fruitful because it was interrupted and the rest restored freshness to the mind. But it is more probable that the rest was occupied with unconscious work, and that the result of this work was afterwards revealed."

From such a view we can draw certain practical conclusions. In the first place we know not when the illumination will come, and those of us who harbour a multitude of problems may see reason in what has been said for imitating Hobbes, who used to carry a notebook about with him ready for use " as soon as a thought darted." In the second place we can see the importance of rest periods in intellectual life ; persons who are not used to thinking are apt to view " work " in terms of the factory principle of " clocking in," and are liable to believe that nothing is going on in people's minds unless they are in certain places and adopting certain postures. This is an important consideration in an age of industrialism, because the regimentation of people whose business it is to think may not fit in with the incubatory requirements of productive thought ; the geese who lay golden eggs can hardly be expected to understand the nesting requirements of other birds.

Thought and the body.—Besides the general consideration of the hypothetical neural substratum of thought, we find that there are certain gross bodily indications that thought processes are under weigh. Titchener, throughout his book, emphasises the kinæsthetic happenings which accompany his thought, and is inclined to analyse much that is described as " attitude " and " *Bewusstseinslage* " (see p. 394) in terms of bodily sensations. " I am sure," he says (11, p. 180), " that when I sit down to the typewriter to think out a lecture, and again to work off the daily batch of professional correspondence, and again to write an intimate and characteristic letter to a near friend—I am sure that in these three cases I sit down differently. The different *Aufgaben* come to consciousness, in part, as different feels of the whole body . . . there are different visceral pressures, different distributions

of tonicity in the muscles of back and legs, differences in the sensed play of facial expression. . . ."

This kind of thing has so impressed observers that some one has said that "we think with our muscles." Humphrey, in Boring, Langfeld and Weld's "Psychology," refers to experiments in which subjects were trained to relax completely, and in which "when these trained subjects were in a state of complete relaxation, they reported that thought did not take place." "Change of muscular tension during thought is a matter of common observation. The brows are wrinkled. The posture is often intent. Even the chimpanzee may scratch his head when confronted with a difficult problem" (p. 481).

Contents of consciousness.—The theories which we have been discussing deal in non-conscious mechanisms : associative ties, determining tendencies, structures, anticipatory schemata, fields of force, etc. They are invented for the understanding and explanation of the one-after-another-ness of our thoughts, and are not to be confused with the thoughts and presentations which we consciously "have."

When we say that a determining tendency manifests itself, or "comes into consciousness" in the form of a desire, we are speaking intelligibly but not strictly ; what we mean is that we believe that there is a determining tendency present and that it causes the experience which we transcribe "I desire x," and afterwards causes behaviour leading to the getting of x, whether "x" be a practical goal or the solution of an intellectual problem. The trouble is that "desire" is ambiguous : it means "an experience of desiring" and "a motivating force" ; the former is a conscious event, the latter is not, but descriptively we name the motivating force after the "desiring" to which it may (or may not) give rise.

What, we must now ask, do we consciously "have" when we think ?

One thing is certain : we have images, muttered words, and that curious experience of verbalisation which we have mentioned before (*cf.* p. 323).

In the early years of this century there was a great deal of experimental activity, associated with Külpe of Würzburg, which aimed at answering this question ("*Ausfrage*" experiments).

Students were given problems of the following simple kinds:

> Judging weights, adding numbers, answering questions (Marbe).
> Constrained association (Watt and Messer).
> Judgment of the relative value of pairs of philosophers, statesmen, artists (Messer).
> Answering difficult questions: Was the Pythagorean proposition known in the Middle Ages? Can thought be applied to the nature of thought? (Bühler).

They had to answer the questions set, and then give an account of their experience.

Two concepts emerge, to become bones of contention between psychologists ever since:

(1) *Bewusstseinslage.*—The "attitude" or "lay-out" of consciousness. When a problem is posed, or a stimulus given, there are vague attitudes—uneasiness, ignorance, uncertainty, hesitation, remembrance of instructions given, which are not images and not percepts. It is obviously an attempt to refer to some total state of mind which is coloured differently from moment to moment. It is not so much an item *in* consciousness as a way of speaking of the conscious field itself.

(2) *Bewusstheit.*—Awareness of meaning. This is a more serious matter. For Ach, the presentational content of consciousness is "the imaginal representational in consciousness of the content imagelessly present as knowledge" (11, p. 104).

He puts this down to the subliminal excitation of reproductive tendencies, which, if allowed full expression would produce associated images in the mind, but which are inhibited by the purposes of the moment, and only produce

an aura which clings round the word, and which *is* its meaning. We are reminded of William James and his " psychic overtone, suffusion, or fringe " which " designate the influence of a faint brain process upon our thought."

The question is : are there non-presentational (" *unanschaulich* ") contents of consciousness, and, if there are, can they be analysed into incipient associated imagery ?

Hoernlé (15) puts the case for the non-presentational contents thus : " What normally occupies the focus of attention is the meaning, the objective reference, whereas the sign forms the fringe, of which we have but a more or less shadowy consciousness." This was written as a criticism of James, and is a direct reversal of his view.

Bühler (16, p. 317) is explicit : " The essential constituents of our thought-experiences are thoughts and thoughts alone."

Titchener, on the other hand, is equally definite : " Bühler's thought-elements I frankly disbelieve in " (11, p. 182). For Titchener there is only presentational content, but the images, kinæsthetic and otherwise, of which he has great abundance, derive their meaning from the part they have learnt to play in serving our purposes. " Meaning," he says, " so far as it finds representation in consciousness at all, is always context " (11, p. 175). For him, the fundamental feature of behaviour is action in an environment, the meaning of our acts is the way they serve our purposes, and, since thinking is simply an elaboration introduced between the receptive and the executive, the meaning of the items that make up thought is derived from the context in which they come.

Here we have a " sensationalistic " approach : there is nothing more before the mind than the sensations and images which we can catalogue. This contrasts vividly with the analysis of such psychologists as Messer (17) and Driesch. Messer gives us an elaborate classification of types of *Bewusstseinslagen* : *e.g.* consciousness of reality, consciousness of causality, logical relating consciousness, and so forth. Driesch (18) distinguishes various " accents of order " (*Zeichnen*) which are present before the mind

when we think: *e.g.* accent of fittingness (*Endgultigkeitszeichen*), accent of solution (*Erledigungszeichen*), accent of reference (*Erlebtheitskreiszeichen*), by which he means the accent which varies according as we are referring to the real world or to an imaginary world.

When we read such catalogues of accents and "consciousnesses of . . .," we must remember the warning of Titchener not to confuse what we consciously have with the logical relations of what we are thinking about. It is hard sometimes to be sure that we are keeping them apart.

Supposing I read "whales are mammals" and understand it, I must *not* say that the relation of class-membership was before my mind *on the grounds* that what I understand is that whales belong to the class mammals, and I must *not*, on those grounds, introduce into my mind a special class-membership consciousness.

That is certainly true, but when I apprehend a conclusion as following from the premises, do I simply have the meaningful premises and then the conclusion, as three separate propositions and nothing more, or is there something which I can discriminate in my consciousness, which I can call an "accent of fittingness" or by some such name, and which is not there when I do not give the title "seeing the conclusion as following from the premises" to my performance? Perhaps the difficulty of deciding is that we have not an adequate vocabulary for naming the characteristics which our states of consciousness have when we are thinking.

Let us return to the material with which we think. In our example, do I merely consciously "have" the black marks on paper: "whales are mammals?" No. I have *words* before me. Are they mere clusters of letters? No. They are meaningful words. Does this "meaning" mean incipient innervations? We cannot enter into the vexed question of the various meanings of "meaning"—we have already mentioned one of them: the part played by an item in the satisfaction of a purpose,—but it is certainly very difficult to avoid talking as though, when we understood the meaning of a word, there is before us something more than

the word. Titchener himself uses such language when he says : " As a matter of fact, meaning is carried by all sorts of sensational and imaginal processes " (11, p. 178), a remark with which we shall all agree, and it is not easy to see how the meaning which is " carried " by the presentational content can be made up of accompanying incipient innervations, because that hypothesis leaves out of account the peculiarly intimate relation between the word and the meaning it carries. It may be that when we are challenged to give the meaning of a word, a number of images may rise in the mind, but it is a very different matter to identify the meaning of the word, when we first used it, with the incipient innervations which subsequently become overt. It is more satisfactory to say that the meaning is co-presented with the vehicle which carries it.

Aveling (19) describes some experiments which he conducted, in which he presented his subjects with a number of picture series, each series embodying some general idea. With the pictures of each series he presented a nonsense word, and the question was : what happens when the meaning of the word is apprehended ? It is an investigation into the process of abstraction, but a point emerged which is important for our present purposes. " At a particular stage in the process of association of word and objects, the image revived by the word tends to become more fragmentary and obscure ; though the associated concept is unimpaired, and the meaning is given as certainly, or more certainly, than before the phenomenon was observed " (p. 241), and later he declares : " The universal is phenomenologically present, or tends to be present to consciousness as a concept or imageless substantive content " (p. 242).

Imageless thought.—Can meanings be before the mind without any " carriers " ? The notion has been hotly disputed. If you go to a foreign cinema and know enough of the language to understand what is going on, and if you have been talking the language all day, it frequently happens that when you are asked to translate a caption you are incapable of doing so. The English language system is for the moment

in abeyance, and the foreign language must not be used; do you not then have the idea before the mind, without having any clothing to fit it? After all, we need not take such exaggerated examples as this; we do frequently know what we want to say without having words by means of which to say it; we often think of what we are about to say while we are saying something else, and when we do verbalise our thoughts to ourselves, which, admittedly, happens most of the time, the verbalisation is very sketchy. A Frenchman named Naville suffered from aphasia, and could find no clothing whatever for his thoughts, but he reported, when he recovered, that he had thoughts before his mind without any images to act as their vehicles.

In laboratories imageless thought is often not found. Can one be surprised? If you look for thoughts, you look for images which mean them; it is in everyday life that imageless thought is likely to be found.

Analysis of thought itself.—To the investigation into the selective and shaping mechanisms, and the identification of conscious contents, we must add a third topic: the analysis of the essential operations involved in all thinking. Spearman (20) has displayed cognition as involving three "non-genetic principles": (1) the apprehension of presentations, (2) the eduction of relations: "the presenting of any two or more characters tends to evoke immediately a knowing of the relation between them" (20, p. 342), and (3) the eduction of correlates: "the presenting of any character together with a relation tends to evoke immediately a knowing of the correlative character" (20, p. 343).

Abstraction.—One operation, which is implicit in the Spearman scheme, and which has to be mentioned in any treatment of thinking, has received special attention. All productive thought, and here we include creative imagination, day-dreaming, and "wool-gathering," involves the re-organisation of elements which have been presented in "experience." Since any experience is a totality, and not a mere additive congeries of elements, since, that is to say, the character of an experience depends on its shape, pattern,

or organisation, the newness of creation is real enough because the oldness of the elements pales in significance before the novelty of the new way in which they are put together.

How, then, do we take out or abstract from a totality various qualities which we can make up into a new totality for playful or practical purposes ? So far there is no proper answer to the question. All we can say is that we form concepts : (1) when we are interested in some subject-matter, (2) when a common element is presented in a variety of settings, and (3) when the matter forces itself on us. Experimental attack on the problem of abstraction usually takes the form of the experimenter having previously abstracted some quality or set of qualities, which he then presents to subjects, mixed up with other qualities, to see whether the subject will be able to pick out the quality which the experimenter has in mind : *e.g.* a set of pictures, each embodying a characteristic and each having a name written underneath, might be shown a subject to see whether he picks out the common feature of the pictures to which the name might refer.

Heidbreder (21) has shown the importance of surprise at success or failure in the discriminating and abstracting of characters in a situation.

Moore (22) showed his subjects a number of groups of five figures in succession, all the groups taken together had one figure in common, and the subjects were to indicate which this figure was.

In ordinary life it is obvious that our interests and purposes will determine what concepts we shall form. In the observations of Piaget on children's conversation and opinions we notice how important action and utility value are. Children are animistic and egocentric in their point of view : a fork is " to eat with " and a mother " to take care of you," and the same concentration on what things do, how they affect us, how they fit in with our purposes is manifest in the thought of primitive peoples, so far as we are able to get some notion of it.

An interesting example of this is " holophrastic speech." " In the old Huron-Iroquois language *eschoirnon* means ' I-have-been-to-the-water'; *setsanha*, ' Go-to-the-water'; *ondequoha*, ' There-is-water-in-the-bucket'; *daustantewacharet*, ' There-is-water-in-the-pot' " (23, p. 141). Savages seem to divide their world up differently, less analytically, than adult civilised people.

It is important to remember that, save for special circumstances, or scientific study, we do not look for concepts; we form them in the natural course of living. Similarity is the key, and repetition of instances of the " same " quality is the opportunity, but we must not forget the part played by subjective states. We may have been thwarted on a variety of occasions, and because of the recurrent similarities of state of mind, we form the notion of " ill-luck " lurking for us round the corner, and heterogeneous objects may all be classed under the same heading: " unlucky," not on a basis of observed similarity, but because of the similarity of our feelings on the occasions when we have met them. This is one of the sources of linguistic confusion in philosophic debate, because when we have named something, we tend to suppose that there has been something " there " for us to name.

Collective representations.—The French school of sociology, of which the most famous spokesmen are Durkheim (24) and Levy Bruhl (25), have underlined the richness and publicness of our concepts. When we use the concepts of " causality," " eternal life " or " number " we are making use of something whose richness transcends the sources of individual experience, and something which is common to the groups in which we live, and it is argued that we must have some kind of participation in the " collective consciousness " of the group for us to become possessed of such tools for our thought. It is also suggested that the *content* of some of these concepts is a kind of reflection of a group-coagulation which was once more pronounced than it is now: *e.g.* the concept of the world as a unity threaded through with causal connections is derived from the unity of the groups of which we are members.

Language and thought.—We learn the names of things abstracted from the environment, qualities abstracted from things, and relations abstracted from the pattern in which things are presented to us, and when we want to refer to the things, qualities and relations, and recombine them, we usually do it by means of words.

The psychology of language is too large a subject to be treated here, but one or two points may bé noticed as being of special interest to the psychologist:

(1) In learning a name, we not only hear a word and see a thing, but we apprehend the word as being the name of the thing. This "insight" is essential to speech learning, though it may not be a matter of sudden illumination. Hellen Keller reports that she had words spelled into her hand, and at first was interested in "this finger play," as she called it, then, after an incident of doll breaking because she could not differentiate w . a . t . e . r from m . u . g, she had an experience of understanding: "As the cool stream gushed over one hand she spelled into the other the word *water*, first slowly, then rapidly. I stood still, my whole attention fixed on the motions of her fingers. Suddenly I felt a misty consciousness as of something forgotten—a thrill of returning thought, and somehow the mystery of language was revealed to me. I knew then that w . a . t . e . r meant the wonderful cool something that was flowing over my hand" (26). This is an extreme instance in which the "insight" accentuated the apprehension of meaning. Normally words come insensibly to mean things and concepts because they work, because they bring about the satisfaction of desire, but that is the occasion for understanding rather than its analysis. It is of great importance to appreciate the difference between association and application.

(2) The actual sounds from which words are derived are various: childish babble, emotional grunts are obvious examples. But when, out of whatever material it may have been, words are formed, they do not stay the same, but tend to alter in accordance with certain principles, which it is the business of the science of phonetics to discover.

(3) A language is one of the best examples of that patternedness, integration or organisation to which we have constantly referred. An actual sentence is not a mere collection of words, it has form and style. By abstracting from language in use, we get the idea of the " genius " of a language, the " style " of an author and so forth. The curious thing is that because of its social utility, a language with its syntax, its rules, its shape, and the things you " can't " say in it, becomes an almost independent system. Just as we conceive of our habits, our techniques, our knowledge, our skills, etc., as structures which control our behaviour, so we come to think of a language as a force which moulds our speech, and even, to some extent our thoughts. Such reification may be dangerous, but the point which it is trying to express has to be taken into account. One cannot help wondering to what extent the peculiar genius of the German language, which allows of the formation of new words by adding, prefixing and suffixing, is responsible for the views of some of the " Gestalt " psychologists ; " whole-wiseness " is a barbarism, but " *Ganzheitsqualität* " is nothing to what the German can do if he tries. If you have a language in which the words at your disposal are derived from an atomising of the environment into its elements, it is not easy to refer to the " togetherness " of experience, but if you have a language which has a great many words for the latter concept, then you can pin down your thoughts on that subject much more easily.

(4) Sufficient has been said to show how closely entangled are the intellectual and emotional sides of our natures. The result of this entanglement is nowhere more clearly observable, nor more disastrous for the clarity of thought, than in the realm of a language.

The form of our utterance is given by the language which we speak, and since part of us is interested in the intellectual pursuits of describing and explaining the outside world, and part of us wants to evince pleasure, rage, awe and other emotions, and since both parts make use of language for their expression, it means that any sentence we utter may be a

remark to be taken at its face value, or it may be an emotional ejaculation, or it may partake of both. Such remarks as: "The behaviour of X is unnatural," or "Why does X do that?" or "I cannot understand the behaviour of X" are frequently not descriptions of X's behaviour, nor genuine questions, nor psychological statements about the speaker's state of mind, but ways of saying: "I disapprove of X," or rather ways of evincing disapproval on that subject.

In this way (1) a great many words get so soaked with emotion that they are rendered valueless for intellectual discussion: *e.g.* natural, unnatural, soul, communist, bourgeois. The devastating effects of a failure to distinguish an expression of emotion from a description can be seen by the reader of Pareto's "The Mind and Society," in which he has collected and analysed a gigantic heap of human foolishness.

(2) There are two standards of value: truth and emotional adequacy. The lover who says: "I will love you for ever" does not mean what he says descriptively, but gives satisfactory expression to what he feels. A confusion of standards is responsible for most religious heresy and many domestic arguments: the quarrels about the nature of Christ, which rent the early Christian world, were partly due to a misuse of reason of this kind; the heretics were nearly always more reasonable than the orthodox, but they did not succeed because the orthodox view was more satisfying. In this connection it is interesting to notice the applausive value of simple adjectives like "high," "large" and "hard": when we approve of thinking we call it "high" or "hard," and when we have a taste for a certain hope we call it "larger" than those against which we have developed a prejudice.

Value of verbalisation.—In the performance of a practical task, which is not automatic, the reasoning process is interpolated between the setting of the task and its performance, and between one stage and another. It has been found that nearly every one, when they learn a maze, verbalises as he proceeds: "now turn to the right now left," and uses language to sum up a whole group of such instructions.

Head discovered that aphasiacs, when told to imitate the movements of an experimenter, sitting opposite to him, could not do so because they had lost the power of making a symbolic formulation of the task.

Rationalisation.—To say that man is a rational animal is not only to say that he sometimes reasons, but also that he moves most easily in a rational seeming ambience. He seeks coherence and consistency in his account of his own behaviour, and where necessary he supplies it himself by "rationalising." The accumulated knowledge we have about what human beings are like has convinced us that the cause of a person's behaviour very often does not fit in with the "reason" he gives for it. We punish children "for their own good," and we tell our acquaintance about the unpleasant remarks which have been made about them because "we think they ought to know"; we should not admit having antagonistic impulses where it is not reasonable for us to have them, but we know now that we have a great many antagonistic impulses of which we cannot, by the nature of the circumstances, be aware. Any amount of lying, deceit, cruelty and general unkindness is embellished, and made to fit in with a coherent set of principles by a little rationalisation; and it is not only "bad" motives that are rationalised away; a person may have built up an ideal of himself as a hard-headed, "unsentimental" character, and a generous act may have to be accounted for as having been done in order to save the trouble of refusing assistance. In certain circles there is a tendency to "vilify" rather than to "embellish," to give a "bad" interpretation rather than a "virtuous" one, and where this régime is established, we find the rationalising taking an "inverted" turn.

Rationalisation should not surprise us, because after all, rationality is essential to us for finding our way about in the world; consistency and coherence are ideals of knowledge and behaviour imposed upon us by our struggle for existence, and unconscious fears of imaginary dangers make it intolerable for us to accept the disreputable side of our characters; "vilification" is only a more refined

technique for covering up what we cannot bear to see at the cost of missing a few marks for " goodness " ; we say : " I admit that I am wicked, that I have all sorts of hideous impulses, that I am thoroughly selfish—and now what ? " Our restrictive forces have triumphed over our repressed forces by intellectualising them.

Theories of thought.—By way of summarising the earlier part of this chapter, we can classify the theories of thought in the following way :

(1) Ideas follow one another in accordance with fortuitous associations, which have been established in past experience.

(2) Thought is action, and the process of thought is the same as the process of action ; we proceed by trial and error and thought is substitute action.

(3) Ideas follow each other under the control of determining tendencies, or structures.

(4) Ideas follow one another in accordance with rules of " closure " appertaining to systems of force in a state of tension.

(5) Thought, like all mentality, refers to some reality outside the thinker : it " intends " or " points " beyond itself (Brentano). This way of looking at the problem of thought is more concerned with the validity of thought than with the process itself. It is mentioned here because, although we must beware of venturing over the boundary between psychology and philosophy, we must remember that we are thinking ourselves when we are putting forward a theory of thought. If, as I believe to be the case with associationism and behaviourism, we develop a theory of thought which stands in the way of any understanding of how thought can ever be true, we are in the position, parlous but not uncommon among philosophers, of sitting on a bough and sawing it off between ourselves and the trunk.

It is because of this danger that such psychologists as Hönigswald (27) bring meaningfulness and orderliness into the thought processes themselves. For such thinkers it is impossible to derive the essential characteristics of reasoning

from meaningless elements, just as it is impossible to derive behaviour from reflex responses ; meaningfulness is inherent in psychic processes themselves.

The future developments in psychology are bound up with the task of finding adequate ways of coping with the notion of organisation. Psychology, as we have seen, has been turned upside down. Instead of trying to build up from elements, we tend more and more to accept wholes as our starting-points and then try to find out the rules of their working. Thought presents a special difficulty because of its transcendant claims, and the attempt to deal with these will doubtless lead us towards a conception of a more extensive whole which involves thought processes among its constituents. The truth-value of thought processes might then be ensured in terms of the harmony or disharmony of a train of thought with the larger whole in which it occurs. If this turns out to be impossible, then thought processes will never be more than prose-poems, or else we shall have to suppose that there is some quite peculiar way of bridging the gulf between the process itself and the reality which it claims to be " about."

(1) Lewin. Psychologische Forschung, 1, p. 191, and 2, p. 65.
(2) Woodworth. Psychology. A Study of Mental Life.
(3) Ach. Uber die Willenstätigkeit und das Denken.
(4) Watt. Experimentelle Beiträge zur eine Theorie des Denkens. Archiv f. d. Ges. Psychologie, IV, p. 289.
(5) Seltz. Die Gesetze der produktiven und reproduktiven Geistestätigkeit.
(6) Wittmann. Der Aufbau der Seelischkörperlichen Function.
(7) Krüger. Neue Psychologischen Studien.
(8) Petermann. Das Gestaltproblem in der Psychologie.
(9) Driesch. The Crisis in Psychology.
(10) Koffka. Principles of Gestalt Psychology.
(11) Titchener. Experimental Psychology of the Thought Processes.
(12) Harrower. Psychologische Forschung, 17, p. 57.
(13) Wallas. The Art of Thought.
(14) Poincare. Science and Method.
(15) Hoernlé. Mind. N.S., XVI, p. 82.
(16) Bühler. Archiv für die gesamten Psychologie, IX, p. 297.
(17) Messer. Archiv für die gesamten Psychologie, VIII, p. 1.

(18) Driesch. Die Logik als Aufgabe.
(19) Aveling. The Consciousness of the Universal.
(20) Spearman. Nature of Intelligence.
(21) Heidbreder. Archives of Psychology, 73, p. 106.
(22) Moore. University of California Publications in Psychology, 1, p. 73.
(23) Marrett. Anthropology.
(24) Durkheim. Les Formes élémentaires de la Vie Réligieuse,
(25) Lévy-Bruhl. Primitive Mentality.
(26) Keller. The Story of My Life.
(27) Hönigswald. Die Grundlagen der Denkpsychologie.

CHAPTER XXII.

THE RELATION BETWEEN BODY AND MIND.

THIS problem raises philosophical questions which it is not suitable for us to discuss in a book of this kind, and we shall have to balance ourselves on the narrow edge which separates psychology from metaphysics—an edge which we may frequently miss because it is very difficult to decide exactly where it is.

The common-sense view is that attached to every living human body is a thing which is called a " mind " and which is different from the body. It is roughly conceived of as " having experiences " but being more than the experiences which it " has," and as moving the body about to suit its convenience. There are thus two sides of this entity which we call the " mind " : the receptive side and the active side. Reflection may make us think that in perceiving its environment it is, in a sense, active, and that inasmuch as it is determined by the past and by the conditions of the moment, it is, in a sense, passive, even when it is operating the machine which has been handed out to it, but unreflective thought deals with a thing which receives impressions through the senses and acts through a physical instrument on the environment.

Let us accept the common-sense picture for the moment and consider the evidence which is relevant to the nature of the connection between the two entities : the body and the mind. We shall then mention some of the theories which have been put forward by philosophers and psychologists as to what " really " is the case.

A. Changes in the Body Associated with Changes in the " Mind."

For the psychologist the most important part of the body are the sense organs (eye, ear, taste-bulbs, etc.), the central nervous system, the autonomic nervous system, and the ductless glands. The central nervous system includes the brain and spinal chord and the nerve fibres which run from the sense organs to the central portion (*afferent* nerve fibres) and those which run from the centre to the striped muscles (*efferent* nerve fibres). The autonomic nervous system is the system of nerves which governs our respiration, blood supply and digestion. The ductless glands are chemical factories which lie in the blood-stream and pour their secretions straight into it, and not (as is the case with the sweat glands) through pipes on to an outer (or inner) surface of the body.

(1) It is obvious that the sense organs are important because if we have no eyes we cannot see and if we have injuries to our ears we cannot hear. This is a matter of vital importance to the discussion of disembodied minds, because it is held by some that all the material " before the mind " either has come through the sense organs or is now coming through them, and it is suggested that if we had no sense organs we could have no new experiences. Against this it is urged (*a*) that there might be other means of having experiences, and (*b*) that the phenomena of telepathy is an instance of a way in which something new can come into the mind without the participation of the sense organs.

An interesting case is reported by Strümpell of a man who could only see with one eye and hear with one ear and had no other sensations at all. When his two functioning organs were cut off from stimulation he fell asleep.

(2) The grounds for asserting the importance of the central nervous system is that injuries to it are attended by incapacity in the mind. If we cut the suitable nerves we cannot see or cannot hear as the case may be ; if we cut another kind we cannot move our limbs, and if we have an injury to the head

we may either have the fullness of our experience diminished or we may be rendered incapable of doing things which we were able to do before, or both. Injuries to the nerves outside the spinal chord and brain are attended by incapacities of a narrowly defined extent. If we cut the optic nerves we cannot see, if we cut the nerves leading to a certain muscle we cannot move that muscle ; the extent of the damage is determined by the geography of the nerves. When, however, we come to injuries to the brain we find that the damage done to our capacities is rather different. Sometimes, it is true, a sense may be blotted out, but sometimes it is our memories that are affected, sometimes our perceptions are modified, and sometimes our power to order our speech is disturbed rather than our power of utterance itself.

Localisation.—During the nineteenth century a great many experiments were performed on the brains of animals and humans. The brains of animals were electrically stimulated in various places and the results were observed, while the brains of human beings, when opportunity offered, were similarly excited. People suffering from various defects, such as aphasia (speech defect), were discovered to be suffering from tumours or wounds in various parts of their heads. The result of such observations was the mapping out of the brain into various areas associated with various senses and motor capacities. The part near the ears was associated with hearing, and the part at the back of the head with seeing. Two narrow bands running over the top of the head were marked out as being associated with movement (the one in front) and touch and muscle sensations (the one behind). The parts of these band-like areas at the top of the head have to do with movements and touches from the toes, then come the hips and arms and so on in an order from the top of the head to the side which is opposite to the order on the body.

Thus we get the impression of certain pieces of the brain being responsible for certain sensibilities and functions, so that if any given piece of the brain is injured, the corresponding sensibility is removed or the corresponding function put out of action.

The simplicity of this arrangement so charmed the psychologists who want to stress the dependence of the mind on the body, that they filled the picture in by saying that the frontal parts of the brain are responsible for association, for which there is very little evidence.

Modern research has shown that the rigid mapping out of the brain into areas like these is not at all satisfactory.

(*a*) Head (1, p. 431) tells us that the motor response elicited by stimulation of the same area of the cortex is not constant, but depends on the character of the excitation and on the events which have preceded it. Sometimes there is a reversal of the expected response, and sometimes a deviation from the part moved: *e.g.* an area previously giving contraction of the face may give movements of the elbow if approached from above downwards on the precentral gyrus (p. 434).

(*b*) Considerable parts of cortical substance may be destroyed without appreciable disturbance of function. Ladd (2, p. 265) reports a case of an army officer who was not seriously incapacitated by the loss of a large quantity of brain substance in the parietal region.

(*c*) The extirpation of parts of the brain does not destroy the power to learn or the retention of what has been learnt to an extent which would be expected if the various areas of the brain corresponded in a detailed fashion to the things they could do. Lashley and Franz (3) report that after rats have been taught to run a maze, or to get food from a box in a complicated way, they show signs of retaining something of what they have learnt, and are re-educable, even after they have lost considerable portions of their brains. With respect to the more complicated habit, it was found to be retained when some portion of the frontal lobes was intact, but "the particular part preserved is immaterial."

When a monkey had the left motor area of the cortex removed the right side was at first paralysed because the nerves coming from one side of the body cross over to the opposite side of the brain. The experimenters tied up the left arm so that the animal could not use it and after a while it was able to use its paralysed hand (4).

(*d*) Analysis of the relation between the occipital lobes and the visual field discloses that while there is a connection between the right halves of the fields and the left hemispheres and between the left halves of the fields and the right hemispheres, there is no point to point correlation between the occipital area and the visual field.

Gelb and Goldstein (5) investigated cases of gun wounds which had injured one hemisphere, rendering the patient hemianopic. This means that if a small object is introduced from the periphery and he is told to say when he sees it, one can map out the retinal area which is sensitive, and it can be shown that the whole side of each retina, opposite to the side of the lesion, is blind. The hemianopic does not, however, experience a half-moon shaped field of vision, but a centralised field, like every one else. The centre of clearest vision may be at a point of the retina not suitably constituted (pseudo fovea), and the amount he can see in everyday life surpasses the amount he can see when his retinæ are explored by " meaningless " stimulation.

(*e*) The work of Head on aphasia is of the greatest importance for the understanding of the way the brain functions, and also for the contribution it contains to the principles which have to be borne in mind when we are examining the functioning of human beings. The study of aphasia—speech defects—is historically important because it was a case of aphasia, studied by Broca, which gave considerable encouragement to the notion that the brain could be mapped out in areas corresponding to human functions. Broca's patient suffered from some speech defect, and was found to have something wrong with a part of the brain on the left side of the head in a region subsequently known as Broca's convolution. This made people think of speech defects (*aphasia*), writing defects (*agraphia*), reading defects (*alexia*) as each being due to a disturbance of some centre in the brain, and the symptoms coming under each heading were regarded as homogeneous.

Hughlings-Jackson, and afterwards Head, insisted that these defects were imperfectly analysed. Their work is

analogous to the contribution of modern psychiatrists to the knowledge of mental abnormalities of a different kind. In the old days a person who behaved in certain ways was just considered insane, and apart from a classification of the various kinds of madness, no attempt was made to find out the significance of his behaviour or his utterances. The modern psychiatrist is interested in the ravings of the lunatic because it gives a clue to the " meaning " of his behaviour.

Similarly, Head was not content to lump all speech defects together, but analysed the various forms which these speech defects took, and he found that some patients were able to do one thing and some another. He discriminates four main classes :

(i) Verbal aphasia : verbal formulation, rather than understanding defective. Naming possible, provided sound could be uttered.
(ii) Nominal aphasia : common objects cannot be named.
(iii) Syntactical defect : words can be formed, but " jargon " is spoken.
(iv) Semantic : patients unable to tell a connected story.

The great contribution to the study of such defects, which we owe to the work of Hughlings-Jackson and Head, is the principle that we cannot tell what a patient is capable of unless we place him in a position in which he has a variety of tasks to perform. The earlier investigators were content to regard all speech defects as forming a homogeneous class ; nowadays it is realised that " symptoms are the answers given by the organism to the questions asked of it, and are therefore dependent to a certain extent on the nature of the questions " (6, p. 11). The patient, therefore, has to be watched going about his ordinary business, because it may well be that he can use a word when the occasion demands, though he is unable to utter it when the doctor asks him to.

Each of these forms of aphasia seems to be associated with different geographical areas of lesion, but the point to be noticed is this : it is not so much that one word or a set of words has just disappeared, leaving a gap, or that one unitary

function has dropped out; something of a more general nature has been disturbed. It may be that utterance has been impaired or it may be that the *use* of words, rather than the words themselves, has gone awry. Head expresses this by speaking of defects in *Symbolic formulation.*

(*f*) *Lack of specificity.*—If there were a detailed correlation between what happens in the mind and what happens in the nervous system, we should expect that there would be specific nerves for one job and specific nerves for another.

In the case of the quality of sensations, this is not the case. " The quality of the sensation seems to depend on the path which the impulses must travel, for apart from this there is little to distinguish the message from different receptors " (6, p. 119).

This lack of specificity is further borne out by the astonishing experiments which have been performed on transplantation, and joining up nerve endings which serve different purposes. " If one joins a part of a central resected nerve to the peripheral end of another severed nerve, and if the two grow together, then the previously impotent muscle can now be moved by an act of will " (7, p. 141). Förster joined a nerve root which normally is concerned with the movement of the shoulders to the peripheral end of a nerve which is concerned with the movement of the facial muscles, and after a while the patient was able to move his face without moving his shoulder at the same time (7, p. 141).

(*g*) A rather different set of facts may be mentioned here, not only because they illustrate defects in the old-fashioned simple localisation of functions, but because they contribute to the general understanding of the part played by the brain in human behaviour. A considerable amount of work has been done on the alternative use of limbs after amputation, or after extirpation of part of the brain. If the capacity for doing something were represented by a single centre, then if that centre were removed or if the limbs with which that centre was connected were cut off, the organism ought to have to learn new actions from the very beginning. In lower organisms this does not seem to be the case, and in

man it is surprising how soon alternative modes of functioning are developed. This is not so surprising to common sense, because common sense uses the language of instrumentalism, and thinks of the " mind " as controlling the body, so that if one instrument is lacking the " mind " makes use of another. It ought, however, to be surprising to those who believe in the simple localisation of faculties in the brain. We therefore find such facts as these, and the discoveries of Head and others, used by theoretical instrumentalists as evidence that the common-sense position is not altogether wrong.

Another way of looking at the matter is presented by Goldstein (7). According to him, and his view is allied to that of the Gestalt school, the organism operates as a whole, and its response at any given time is a patterned condition of that whole. There are no specific centres in the brain but rather a plastic capacity to respond by configurating itself in ways which are suitable to the situation and convenient for the satisfaction of the needs of the organism. If the tissue is injured, the configurating tendency is still there and does the best it can, even to the extent of altering the configural patterns in a way which will bring into action parts of the organism not usually operative in the situation to which the response is being made.

All the facts which we have been considering, and others for which we have no space, force us to modify our simple localisation map. It remains true that certain areas are connected especially with certain senses, but we must leave room for a considerable degree of non-specialisation within those areas and in the brain as a whole.

(3) The effects in the mind of changes in the vegetative system are familiar to every one. The word " dyspeptic " indicates mental as well as physiological symptoms. The mental effects of vegetative disorders are mostly of the nature of emotional colouring, a fact which is of interest in view of the organic component of emotions, when these are caused by external situations. An important example of emotional symptom attending an internal disorder is the anxiety which

often accompanies angina pectoris. It has been suggested by Freud that the emotional response of fear to a situation apprehended as dangerous is what it is because our first response to a situation fraught with danger, *i.e.* being born, included, in the nature of things, constrictions like those which occur in angina pectoris, so that ever afterwards we make the same response to any other situation apprehended as dangerous whether it calls forth that specific response by its own nature or not.

(4) The ductless glands have received special attention of recent years, and exaggerated claims have been made on their behalf. It has been said that our characters are determined by our glandular constitution. This is going too far, but the excess or deficiency of certain glands does undoubtedly have far-reaching effects.

Thyroid.—Situated in the neck. It regulates metabolism, moisture and certain features of growth.

Hyperthyroidism is a condition of excitability, which may even develop "flights of ideas." The patient is restless and emotional, and sometimes the gland will swell in such a way as to press on certain nerves causing the eyes to bulge out of the head (exophthalmic goitre).

Hypothyroidism is the opposite condition: thyroid deficiency. The main features are: a sluggishness of bodily processes, cretinism, inability to learn. A condition known as myxœdema" is also the result of thyroid want: the face and hands increase in size, the skin gets dry, and general listlessness may set in.

Anterior pituitary.—Situated, together with the posterior pituitary, at the base of the brain. Controls growth. Excess produces gigantism, and deficiency produces dwarfism. Such conditions may lead to secondary effects in the personality due to the distinction conferred by the possession of abnormal size in either direction.

Adrenals.—Situated near the kidneys. These glands are brought into action whenever a special effort is called for. Injection into dogs causes them to exhibit many of the external symptoms of fear. Constant pressure of work and

anxiety may cause the gland to secrete excessively, with the result that it may wear the system out by the action it has on the blood. The function of the secretion is to clear the decks for action and mobilise energy to meet a crisis, but it is, as it were, " meant " as a preparation for physical activity, and the kinds of situations which cause the secretion to take place are frequently not such as are met by expenditure of bodily energy. The result is that the organism is thrown into a state of irritability and tension which renders it prone to violence. The liability of the gland to overwork under the pressure of modern life, and the resulting liability to aggressiveness are of obvious sociological importance.

These glands are also, as Heard expresses it, " the glands of immediate resistance," and they are called into action by the experience of pain. If pain is not experienced the glands do not respond in situations where increased resistance would be of use to the organism (*e.g.* in operations under anæsthetic).

Sex glands.—Situated in the testes and ovaries. These glands control the secondary sex characteristics. The most important experimental results for the psychologist are those concerning transplantation. There is evidence that sexual desire is diminished when the glands are extirpated, and transplantation of the glands of a male into a female from whom the glands have been removed, or from a female into a male under the same conditions, produces an alteration of sexual desire. The morphological females with male glands seek females, and the morphological males with female glands seek males. Such experiments have, of course, been performed on animals, but the results have been applied to human beings in certain cases where homosexuals, believed to have glands producing a female secretion, have had their glands exchanged for those of heterosexual males. The whole position is complicated in humans by the fact that sexual desire is found to be profoundly influenced by the experiences of childhood and the attitudes which such experiences have set up, so that it is difficult to estimate the results of such physiological operations.

It was found by Steinach that rats in which the production of spermatozoa was curtailed by transplantation of the sex glands lived longer than normal rats, and this was believed to be due to the increased activity of the ductless glands. As a result operations have been performed on human beings which curtail the production of spermatozoa (*e.g.* section of the *vas deferens*), or they have had glands planted inside them to make up their own deficiency, and it is found that an improvement in vitality takes place. The arteries, however, eventually decay and thus we are saved from eternity.

Thymus.—Situated in the chest. Its principal function is to restrain sexual development and control growth. It normally ceases functioning at puberty, but if it has ceased to function before the result is premature sexuality, while if it goes on functioning after puberty we have symptoms of incomplete development, perpetuation of youthfulness and various signs that the subject has not completely grown up.

Pineal.—Situated in the head. Little is known of the function of this gland. It has, however, a distinguished history because it was believed by Descartes to be the seat of the soul.

Such are the most important ductless glands from the point of view of the psychologist. Not all the ductless glands have been mentioned, and only a few of the more striking effects of their secretions have been touched on. It is important to remember that the glands form a system which tends to regulate itself so that when something goes wrong in one place, compensatory activity is set up in another. Many of the secretions have been isolated, *e.g.* "thyroxin," "tethelin" (ant. pituitary), "pituitrin" (post. pituitary), "cortin" (adrenals), and can be used artificially.

(5) *Drugs and narcotics.*—The effects of the absorption of drugs and narcotics are various, and only a few examples can be given.

One of the most important results of the frequent taking of several drugs is that states of tension tend to recur spontaneously which demand for their release the drug which has been frequently absorbed. The power of a given amount

of the drug to give relief diminishes, and more and more has to be taken. The whole organism participates in these recurrent states of instability, so that if the supply of the drug is suddenly cut off a very serious condition ensues. The organism adapts itself to larger and larger doses, and to remove the drug is to remove the principal ingredient in the situation to which the body is adapting. The result of this is that when a person has adapted himself to tolerate large amounts of a drug, and when he is subjected to these recurrent states of irritation, the whole economy of the organism, his interests, his lies and his planning, are directed towards the obtaining of his drug.

We may now consider some of the important effects of drugs.

Taken in large quantities, such drugs as morphia, chloroform, ether, nitrous oxide, obliterate consciousness, and render the subject anæsthetic. Other drugs, such as the barbiturics, have a less widespread effect; they cut the subject off from the conscious effects of certain stimulations, but leave him free to experience pain.

Opium, morphia and cocaine relieve pain and anxiety and seem to lift the subject into a condition of freedom from the ills and torments of life. When, however, the subject becomes an addict, the serenity is intermittent, and volition is paralysed. "Even the effort of will needed to carry out the simplest act is now lacking," writes Lewin of the morphinist (8, p. 60), while of the cocaine addict he says: "Will power diminishes, and indecision, lack of a sense of duty, capricious temper, obstinacy, forgetfulness, diffuseness in writing and speech, physical and intellectual inability set it" (8, p. 83).

Peyotl, Indian hemp and fly-agaric produce perceptual modifications. Lewin describes a subject under the influence of peyotl as seeing "with his eyes open wide white and red birds, and with closed eyes white maidens, angels, the Blessed Virgin, and Christ in a light blue colour" (8, p. 103). Indian hemp (hashish) may produce illusions of sight and hearing, such as the magnification of sounds ("a murmur gives the impression of a waterfall" (8, p. 118), and it may

give rise to elaborate delusions of identity (9, p. 120). Fly-agaric, too, produces illusions of size: "a small hole seems to be an enormous abyss, and a spoonful of water a lake."

The inhalation of benzine, nitrous oxide, and ether is reported as producing illusions, dreams, feelings of peace, etc. According to William James, "nitrous oxide and ether, especially nitrous oxide, when sufficiently diluted with air, stimulate the mystical consciousness in an extraordinary degree" (9, p. 387).

To the majority of human beings who do not come into contact with these preparations, the most interesting drug is alcohol. Alcohol acts as a depressive which successively attacks various levels of control. The first, and most familiar, effect of its action is the liberation of emotional display after the depression of the controls which normally make us the restrained creatures we are. Later on the depressive effect reaches other controlling "centres," and after experiencing deficient co-ordination between hand and eye, deficient co-ordination between the two eyes themselves, deficient co-ordination of speech, and other motor activities, the subject may find himself inert on the floor. A great many experiments have been performed in psychological laboratories on the effect of alcohol and other drugs on the capacities of the organism. It has been found, for instance, that alcohol causes faulty estimation of time, retardation in the process of adding, and faulty aiming. Such researches are, of course, of great scientific interest, but we must bear in mind a warning with which we have met before when we attempt to apply what has been discovered under laboratory conditions to everyday life. The warning is that in the estimation of an organism's capacities, we always have to take into consideration the nature of the situation in which it finds itself. A person doing a few tests in a laboratory is not the same thing as the same person in charge of a motor-car, and if it is discovered that after taking a certain amount of alcohol he cannot aim accurately at a moving strip of dots in the laboratory, we cannot infer that the same amount of alcohol would make him aim at a lamp-post if he were driving.

What may be depressed in the laboratory is his desire to do well in an experiment which he regards as somewhat silly, while the circumstances of driving a car may call forth energy to overcome the deleterious effects of the drug. There are, after all, cases of surgeons whose best work has been done under the influence of alcohol, and we do not know how they would have fared if they had been faced with a column of figures to add instead of a patient etherised upon a table.

Among the experiments that have been performed on the effects of drugs, we may mention McDougall's (10, p. 74). He used ambiguous figures, *i.e.* three-dimensional figures which can be looked at in two ways : reversible cubes, etc., and also the rotating arms of a small windmill looked at " with the line of vision making an angle of some thirty degrees with the plane of rotation." With the latter instrument the alternation is in the direction of seen movement. With all these opportunities for measuring alternation it was found that alcohol, ether and chloroform prolonged the intervals between the alternations, while strychnine, tea and coffee increased the rate of alternations. He also found, in the few cases he was able to examine, that " introvert subjects experienced rapid alternations, while the extroverts displayed a slow rate of alternation " (10, p. 445). The increased expansiveness of the drunkard lends a certain colour to the tentative suggestion, which he makes on the basis of these experiments, to the effect that introversion and extroversion are " mainly determined by some chemical influence of the nature of a hormone or endocrine secretion, or some complex chemical resultant of the general metabolism " (10, p. 442).

(6) *Psycho-pathology.*—The facts which are relevant for our purpose from this field can be classed under three headings :

(i) " Physical stigmata." Deformation of the shape of the skull, ear, palate and extremities (*e.g.* simian hand) are frequently found in cases of mental deficiency and other mental disorders. Attempts have been made in the past

(*e.g.* by Lombroso) to correlate such physical abnormalities in detail with pyschological characteristics, such as a tendency to commit crimes. This is not looked upon with favour nowadays because many physiological deformities have been found in cases of relatively normal development, but if one looks at a series of pictures of mentally deficient persons one cannot fail to notice that they all look physiologically different from normal persons.

(ii) Patients suffering from well-known mental diseases also present physiological peculiarities: (*a*) General disorders : *e.g.* bad health of the melancholic and increased secretions of the manic patient (11, p. 284). (*b*) Specific neural peculiarities : *e.g.* immature nerve cells in dementia præcox and unusual arrangement of the convolutions of the brain in epileptics (11, p. 364). (It must be emphasised that these are only *examples*, taken from a variety of physiological symptoms associated with these two diseases.)

(iii) Patients suffering from certain physiological diseases display marked alteration in their mentality. Obvious instances of this are : *general paralysis of the insane :* " Judgment and reasoning are impaired almost from the first and delusions are the rule " (11, p. 439). " One by one the patient loses control of his instincts. He ceases to attend to business, spends money recklessly and occupies the whole of his time out of doors playing games or motoring " (11, p. 440).

Encephalitis lethargica.—" In children the most striking and characteristic changes occur in the moral sphere. They become disobedient and uncontrollable, and take to stealing, lying and savagery " (11, p. 471). (Again, these are only examples from a variety of mental symptoms found with such diseases.)

B. The Mind Affecting the Body.

So far we have been considering cases where we have good evidence of a bodily change associated with a " mental change." The sense organs and nervous system are held

to be responsible for our sensory experience and movements because when they are injured our sensory experience is modified and our behaviour is influenced. The accent of causality lies on the bodily changes.

We must now consider cases in which the causal accent seems to lie in mental happenings, while the effect is a bodily change. We must remember that we are taking the evidence at its face value here, as before. The reminder is necessary because it may be the case that the mental happenings, which seem to us to be so prominent, are correlated with physiological states, and that it is the physiological states which cause the bodily effects we are interested in, while the mental occurrence may have no causal value whatever.

(1) The most obvious case in which a mental occurrence seems to produce a bodily effect is the decision to perform an act and the carrying out of the decision. Here what bulks large is the decision followed by the action. There may, of course, be some physiological correlate of the decision which causes the action, but this is a hypothesis. We have, however, to grant that our decisions are modified by physiological conditions (*e.g.* drugs), that our power to put our decision into effect may be curtailed by drugs, and that if we are paralysed, we cannot move our limbs however much we will to do so.

(2) *Conversion hysteria.*—In some cases of blindness, deafness and paralysis we find that there is no lesion of nerves which will account for the capacity. Indeed, the sight, hearing and movement may be shown under hypnosis to be capable of operation. In such cases the faculties which are put out of action can be restored by psychological treatment (suggestion or psycho-analysis). Such loss of function can be most easily accounted for in psychological terms, and it has been suggested that we cannot see because we do not want to see, and cannot move because movement means for us something forbidden. How far the mind can be said to affect the body in these cases it is hard to say. In the case of a loss of sensibility (*e.g.* psychic blindness) there is no demonstrable alteration of bodily tissue ; it is rather as

though the information presented to the eye were prevented from getting through to "the mind."

(3) There is a certain amount of evidence for the view that a great many bodily ailments (headaches, constipation, asthma) have mental occurrences among their cause factors. The evidence is that they resist purely physical remedies and respond to psychological treatment. The medical profession is taking increasing notice of such a possibility, and in a recent number of the *British Medical Journal*, Dr. J. L. Halliday, in an article on the "Psychological Factors in Rheumatism," writes as follows about "body language": "Vomiting may mean: I am sick of something or somebody. Coughing may mean: there is something inside me, and I cannot cough it up. Fainting may mean: I am faint-hearted. The list is endless, and extends from the crown of the head (light-headedness and giddiness, moaning: I am uncertain which way to take so I go round and round) to the soles of the feet (I am foot-sore and weary)" (12, p. 215). He also calls our attention to the physiological metaphores which we use in everyday speech: "a pain in the neck," "a broken heart," "an upright man who does not stoop to . . . ," and so forth.

Besides psychological causality of symptoms, we have psychological causality in the cure. The "faith in the doctor" is frequently accepted as a prerequisite for recovery.

(4) According to Baudouin, suggestion can produce profound physiological changes.

(5) From the field of religious phenomena we have a number of cases of physiological changes for which it is difficult to ascribe a physiological cause.

Cases of the production in the worshipper's body of symptoms which parallel bodily changes which he or she have frequently contemplated in states of adoration (*e.g.* stigmata, periodical bleeding, etc.) are well attested, though the usual explanation of such abnormalities is in terms of divine intervention.

Cases of "fire-walking," in which the "believers" in a state of religious enthusiasm have walked unscathed and

painlessly across hot ashes, have been reported. It is further alleged that no preparation is previously put on the feet, and that observers who are not in the requisite frame of mind cannot perform the feat.

The wonders of the East so charm our imaginations that the truth is difficult to discern, but it appears that practice and the performance of certain exercises enable the adept to control his blood-supply, his digestion and his breathing so that he can be cut or buried without the usual results befalling him.

It cannot, I think, be denied that the evidence for changes in the body being responsible for changes in " the mind " is more impressive than the evidence for changes in " the mind " being responsible for changes in the body and this has led many psychologists to neglect the latter or to assume that behind the apparent psychological causes of a movement, loss of function, or physiological symptom lies a physiological cause after all. It may be, so such persons might say, that the cause of these changes can best be expressed if we speak of the psychological happenings that leap to the eye or seem plausible to the interpreting intelligence, but that really everything that happens in " the mind " or is pictured in mental terminology, is paralleled by something happening in the body, so that if we knew the key we could translate from experienced wishes and hypothetical unconscious desires to their physiological correlates. This would not, of course, prevent us from talking the language of desires, wishes, and motives, but it would mean that when we say, " X desires Y " we are using a short form of " There is something going on in X's body which makes it appear to us that X desires Y."

We must, however, consider another important question : Is the body, so far as we know it, capable of paralleling mentality ?

(1) *Memory.*—We have seen (Chap. XIX) that memory is a word which is used in connection with all cases where the past is supposed to affect the present. The occasions themselves are various, and in the chapter on Memory we discussed

a heterogeneous collection of phenomena. They all, however, have this in common: something has happened in the past, and is acting as a cause factor determining something that is happening now to be what it is. The great problem is: how is the past preserved? There is a prejudice in the minds of most people which forbids their accepting the suggestion that there may be action over a distance in time. It is hard enough to accept discontinuity of action over a region of space, and undoubtedly this is responsible for the difficulty a great many people have in allowing the possibility of telepathy: there is no stuff through which telepathic action can take place; with action from the past there is even greater difficulty, because the past is past—over and done with, and it is asked: how can something which is not there be an immediate cause? The result is that we must look round for some place in which the trace of the past is preserved, so that we can carry our pasts about with us—such at least as have not faded away. We may note in passing that the question: *where* is the trace left by a past experience? may be a silly one, because we may be asking a spacial question about something which has nothing to do with space. The answer, however, which is usually given is that the traces are in the nervous tissue.

This involves us in serious difficulties:

(*a*) *Habit memory and memory of events.*—The trace is thought of as an alteration in nervous tissue which is re-excited when circumstances are present which are similar to those which left the trace. We have already seen that there are difficulties in this view. When we learn a habit, according to this theory, we modify the trace left by previous performances, and re-aroused by any given performance, so that the cumulative effect of practice is explained by progressive changes in the trace. Now habit memory is different from the memory of events in the important respect that whereas in memory of events we refer specifically to a past experience, in habit memory the past experiences are implicit, each has doubtless added its quota to our present proficiency but we do not refer to each separately. If we concentrate on habit

memory, the theory that each trace is modified by succeeding practices sounds attractive ; I can typewrite now better than I could when I started because my nervous system has been significantly altered. The difficulty comes in when we reflect that we *can* refer to the previous practices individually if we choose, and this, too, has to be accounted for by a trace theory, but here the whole point is that the trace left by the past is unaltered. Semon tried to get out of the difficulty by suggesting that the successive traces form layers, each separate from the other. This, however, reduces the value of the traces as representing cumulative change, because if they are all separate, how is it that they act together ?

(*b*) The main objection to the trace theory cluster round the point that a trace is a fixed thing and the same trace is the same trace, while the " same " act is not exactly the " same " act. When we do the " same " thing over and over again, we do not act exactly as we did before, we only do the same kind of thing. The " same " in the psychological field is fluid and includes a number of variations on the " same " theme, but the " same " in the physical field is fixed.

(*c*) If you see a figure with the right-hand half of the retinæ, the excitations from that area pass to the left-hand rear portion of the brain. It is there, presumably, that the trace must be left. How then is it that when the same figure is seen with the left-hand halves of the retinæ, so that the right-hand portion of the brain is excited, one can nevertheless recognise it ? The new excitation cannot re-arouse the old trace because it is operating on a different part of the brain.

(*d*) Similarly, if we experience cold in our finger and learn to say " cold," it may be that there is a reduction of resistance along the nerve paths leading from the locality where the cold hand touch left its mark and the motor nerves which are responsible for our saying " cold." If this is what happens we ought not to be able to say " cold " when we feel a cold touch on our toes without learning all over again, and yet this is perfectly possible (13, p. 211).

(*e*) *Recognition of form.*—The " same " tune can be recognised in different keys, the " same " face can be recognised

from a painting or a photograph, and the " same " shape can be recognised even if it be twice as large on the second presentation. If the basis of recognition be the re-arousal of traces, such recognition would not be possible, because the recognised appearances are mediated by an entirely different set of nerves from those which were " used " when the traces were formed.

(*f*) Conversely, if the same form be surrounded by a number of other forms so that it is incorporated into a larger whole, even though the same traces, if any, might be re-excited, recognition often does not take place.

(*g*) When a smell reminds us of a visual experience, the theory is that a trace has been left in the smell area and another in the optic area and that a trail has been blazed (*Durchbahnungstheorie*) between the two. Becher (13, p. 189) asks whether, in view of the close texture of the brain and the multiplicity of traces which are contained in it, we should not expect that numerous irrelevant traces would be aroused in the passage of an impulse from an area, such as the smell area to, say, the visual area, which is a long way away.

Koffka (14, Chaps. X and XI) has developed a theory of memory traces which escapes some of these difficulties. The trace is not to be regarded as " materially " determined, so much as " formally " determined, so that the shape is what matters. This means that there is more flexibility in his traces than in the traces of the old-fashioned " trace theory." His traces are endowed with the same formal, configurational properties as the configurations involved in perception : they may change in accordance with certain configurational rules (*cf.* p. 352), and they are segregated so that the diversity of items included in a trace do not cause him uneasiness because the way in which they are associated is " belonging to the same pattern " and not merely having a lowered synaptic junction.

It is doubtful whether this gets over all our difficulties. For example, he says that when a person learns a relation, say the relation of " opposite " (14, p. 509), some general capacity for realising certain configurations is established,

and this is descriptively true, but the nature of such a general capacity for apprehending relations is different from the trace left, say, by my understanding of a Euclidean proof. In the one case I have a liability to have certain configurations, and in the other I have a trace system which may be aroused when I want it and which has an individuality of its own. Furthermore, I can refer to the occasion on which I learn the relation, and this must mean that there can be a double effect of experiences: in the formation of specific traces, and in the establishments of "permanent liabilities of perception," both of which can be made use of after the original experience is over. Koffka speaks of the possibility of a trace "exerting a direct influence" on old traces, which is a dangerous step to take. Our knowledge of the possibilities of "regression" and unexpected revivification of past experiences makes it seem rash ever to allow the possibility of one trace altering another, because you never know when the one which you have allowed to be altered will not suddenly be required to account for an unexpected memory.

(2) *Emotion.*—(*a*) It might be thought that physiological correlates to situations of desire would be easy to find. If I want my food, there are chemical changes going on in my stomach; if I like this and dislike that, we can easily invent physiological accompaniments characteristic of the first and distinguishing it from the second. But, as Dr. Broad (15, p. 580) points out there is a vagueness about the word accompaniment which will not bear inspection. The like or dislike is *directed towards* its objective, it does not merely accompany the idea of it. I may like my friend's suit and dislike his tie, and I am perfectly aware which it is that I like and which I do not. If the physiological correlates of the two feelings merely *accompanied* the physiological correlates of the apprehension of the two items, it is difficult to see on what physiological basis they attach themselves the one to one item (the suit) and the other to the other (the tie).

Similarly, I feel belief *towards* a proposition and desire *for* an object and the same problem arises: what is the physiological correlate of "towards" and "for"?

(*b*) Cannon discovered that although there are serious physiological disturbances going on when we have the experience of fear, rage or hunger, there seem to be no physiological happenings which are characteristic of each experience, marking it out from the others.

Similarly, it has been found that electrical disturbances can be detected in the neighbourhood of the brain, when the subject is thinking, but so far there seems to be no distinction between the disturbances alleged to accompany a thought of pitch and toss and those which are alleged to accompany a thought of murder. Experiments have also been performed to show that if a subject is laid on a delicately balanced board, the balance is upset when he starts to calculate the result of a sum, but there does not seem to be a difference in his swaying which corresponds to the differences in his calculations.

(3) *Thought.*—We now have to consider the psychological phenomena which put the severest strain on the hypothesis that there is something going on in the brain which parallels whatever is going on " in the mind." When we think, we certainly have a series of images or words or ideas before our minds. (For imageless thought, see p. 397.) The same may be said of us when we are merely day-dreaming but in the latter case there are at least three important elements missing, which play a considerable part when we are thinking : these are (*a*) relevance, (*b*) inference, and (*c*) reference to truth.

(*a*) The chances of co-presentation, contiguity in time and similarity are, as we have seen, inadequate to explain a train of thought. There is a guidance, a directive agency, a determining tendency—however we like to express it—which facilitates some associations and inhibits others, with the result that there is a coherence running through the series. The point here is that on a trace theory one presentation calls up another on a basis of reduced resistance between the neural pathways, and these reductions to resistance are established by the passing of a neural impulse across the relevant junctions. This happens when two items are presented together. The sequence of ideas in a train of thought,

therefore, has to follow the reductions of resistance which have happened to be established in experience, with the result that one would expect far more habitual repetitions in thinking than one actually observes.

The " Gestalt " psychologists abandon the old-fashioned trace theory, and in its place they put forward the view that the state of nervous tension which we call " being faced with a problem to solve " seeks its own " closure " or state of equilibrium in accordance with general laws governing nervous processes, which means that the series of ideas is what it is, *not* because of external relations between traces, but because of the " closure-seeking " process which is going on, so that, although the ideas which will come into the mind must in some sense be derived from experience, the order in which they will come, and the actual choice of those which do come, is determined by the internal relations in the total situation. This frees us from the fixity of externally related traces, but raises the problem of the nature of these closure-seeking processes.

(*b*) A train of thought is not merely a succession of relevant ideas, it involves the logical relation of implication. When we argue that if all men are mortal and if Mr. Baldwin is a man, then Mr. Baldwin must surely die, we have not a mere sequence of ideas about death and a Prime Minister ; we see that the conclusion follows from the premises. What physiological relation could parallel this strange passage of thought from one set of ideas to another set implied by them ? It cannot be that the passage is felt to be so certain because it has been so frequently traversed, because we can " see " that a conclusion follows from the premises even when those particular premises have not been presented before.

(*c*) Supposing we were to agree that thought processes are simply the correlates of physiological processes, we then should have to develop a special theory to account for the possibility of knowledge. This is a philosophical question which faces any theory of what thought is and does, and it is one into which we cannot penetrate, but it is well that we should remember that any theory of thought which is put

forward must be one which allows of the thinking to be in accord with what really is the case, otherwise the very formulation of the theory is a somewhat foolish performance. It is often forgotten by people who write books about thought that their own books come into the fire of their theories.

The position seems to be this : (1) our knowledge of the brain is not sufficient for us to be able to point to a one-to-one correlation between whatever goes on in the mind and something going on in the brain, and (2) we are discouraged from assuming that there must be something going on in the brain which uniquely corresponds to whatever is going on in the mind because the sorts of things the mind is capable of are not the sorts of things of which the body is capable, so far as our knowledge of it goes.

We must, however, remember that the nature of " matter " is still a problem which the scientists have not yet solved. We are apt to forget that the nerves and brain which we speak of are part of the behavioural world and not part of the geographical world, and that when we get to know more about the geographical world we may find that it has properties of which we are at present unaware.

It is further important to remember that all the negative results of an attempt to map out the body and its mode of functioning to fit the mind and its capacities do not point to the conclusion that the mental performances are possible without bodies.

This is a point which we must now consider.

Evidence from Psychic Research.

It is clearly impossible to do more than mention the kind of evidence which comes from this important field of investigation. The evidence may be classified as " direct " and " indirect."

A. " Direct Evidence."

(1) *Haunting*.—There is a mass of evidence that apparitions have been seen by more than one person at a time, and

under circumstances that preclude expectation. The description of the apparitions has frequently been found to correspond with the description of persons known to be dead.

We must, however, remember that not all apparitions are of dead persons. Sidgwick mentions, for example, a case in which a phantom was observed in a doctor's house who was identified as the doctor's daughter-in-law who lived in Australia.

(2) *Recognised "controls."*—Mediums who are "controlled" by more than one "personality" sometimes exhibit gestures and tones of voice which are recognised by sitters as characteristic of the persons who, known to be dead, are alleged to be "controlling" the medium.

(3) Even when the "control" is not recognised, the "personality" which presents itself is so different from that of the medium that it is believed to be the distinct entity it claims to be. Recent research by means of word reaction experiments lends some colour to this view, though the results are by no means incompatible with the "multiple personality" theory. We discuss the phenomena of "multiple personality" on page 212. Here it is sufficient to remark that cases have been observed in which a person has spontaneously exhibited changes in his or her personality, and it is therefore argued that "control mediumship" may be an instance of this. It is significant that "controls" who have given detailed accounts of themselves have been found out not to have spoken the truth: *e.g.* "Phinuit," the control of Mrs. Piper, who pretended that he was a doctor from Metz, but on enquiries being made, it was found that no doctor of that name had lived there. Cases are not unknown of "experimental" personalities being created by sitters.

B. "Indirect Evidence."

(1) The medium, either through a control, or through automatic writing, or by means of some form of direct awareness, gives information to the sitter about persons in whom he is interested. Sometimes the people who are alleged to be

attempting to communicate are rejected, but sometimes the information is sufficiently striking to make the sitter believe that the communication really comes from the person from whom it purports to come. Our ignorance of the possibilities of telepathy make it impossible to assess such information at all adequately, and besides this the evidence itself is frequently obscure, and what appeals to one sitter as good evidence will by no means so appear to another.

(2) Another form of indirect evidence is that obtained by "proxy." A sitter obtains information for a third party, on subjects about which he himself has no personal knowledge (16).

(3) "Cross-correspondences" are discussed on page 216.

It is impossible to decide on the probabilities of survival. The whole subject is further darkened by the fact that fraud has been so often detected, and also by the fact that unconscious forces are undoubtedly at work causing doubt and contempt in the minds of some and over-estimation in the minds of others. However, the evidence is sufficiently important to demand the attention of psychologists; it has impressed Dr. Broad (17, p. 137) enough to make him say: "As a result of my study of psychical research I shall be slightly more annoyed than surprised if I should find myself surviving the death of my present body."

Theories of mind-body relationship.—There are two metaphysical theories which render the question of how the mind is related to the body null and void, because according to one there are no minds and according to the other there are no bodies. They are mentioned here because it is often believed that certain psychologists hold one of them, and because the other would make physical science a branch of psychology.

A. *Materialism.*—It has been held that nothing exists except matter and that the characteristics which we call mental belong to nothing at all. On the face of it this seems absurd enough because it is only by means of mental happenings that we know of the existence of matter.

This view is sometimes associated with Behaviourism, but

it is quite possible that all the Behaviourists want to assert is that the study of the body is profitable and that the study of mental happenings is not. No one can say that this is nonsense, but few people believe it to be true. It is, however, ridiculous to identify mental happenings with bodily happenings.

B. *Mentalism.*—It has been held that matter does not exist, and that all that exists is mental. There is a certain plausibility in such a view immediately we make our first reflection on our knowledge of the outside world. The priority of mind becomes insistent and matter fades away into a collection of sensations. We then find, however, that we have to explain more than we had bargained for, such as the public nature of the world of things, and the proper field for the application for such adjectives as " round " and " square " which do not seem to apply to mental items : a round sensation and a square thought are nonsensical. In any case the data " before " the mind is not " in " the mind in the sense that awareness is " in " the mind.

If we are prepared to reject these extreme theories, then we say that there are mental happenings and there are physiological happenings and that there is some connection between them.

For a full account of this subject the reader must be referred to Broad's " Mind and Its Place in Nature." The following, however, are some of the important suggestions which have been made with regard to the nature of the connection between the mental happenings and the physiological ones :

A. *Epiphenomenalism.*—Mental happenings have no causal effect, and are merely thrown off by bodily processes.

B. *Psycho-physiological parallelism.*—The two series run side by side, without causal action either way.

C. *Interactionism.*—Mental happenings can cause physiological changes and vice versa.

D. *Instrumentalism.*—The mental happenings are regarded as belonging to a " mind " and the " mind " uses the body for the satisfaction of its desires. This is the common-sense

theory, and the language of it is used by many psychologists who might not agree that it represents the ultimate account of the body-mind relationship.

E. *Body-mind.*—We sometimes find that emphasis is laid on the biological aspect of the problem. What goes on " in the mind " and what goes on in the body have to be interpreted in relation to the interests of the organism as a whole. This is not so much a theory of the relation between the body and the mind as a piece of advice as to how we should proceed with our psychologising. We are advised to disregard the relation between mental happenings and bodily happenings and concentrate on the pattern woven out of both materials.

F. *Emergence.*—Just as the characteristics of water cannot be predicted from a knowledge of the characteristics of hydrogen and oxygen, so the characteristics of combinations of living cells cannot be predicted from the knowledge of the characteristics of the cells. Perhaps mentality is a something which belongs to certain arrangements of living cells, and which emerges when the cells are arranged in a certain way.

A form of emergence is suggested by Dr. Broad. He thinks it possible that the mind is an emergent entity which springs from the compounding of a " psychic factor " and a " bodily factor." " The psychic factor would be like some chemical element which has never been isolated ; and the character of a mind would depend jointly on those of the psychic factor and on those of the material organism with which it is united " (" Mind and Its Place in Nature," p. 536).

On this view certain phenomena of " multiple personality " and mediumship could be interpreted as being due to more than one psychic factor coming into contact with the same bodily factor. The psychic factor might survive its union with one physical unit and be the carrier of memories which come to the fore in mediumistic performances.

Those persons who would like to survive will not be very pleased with the idea of so attenuated a form of persistence.

For practical purposes the psychologist has to use the

body-mind framework which he finds the most helpful. His business is to display experience and behaviour, or that special field of experience and behaviour in which he is interested, as a coherent system, and he has to make use of the constructs "body" and "mind." By means of his explanatory frameworks he displays connections which we have missed, and aspects or possibilities of experience which we have not appreciated. His ideal is to enable us to predict what is likely to happen if certain conditions are fulfilled. In so far as he helps us to understand and foretell, his framework is of value, and whether our success in understanding and foretelling is evidence of the truth of his framework is a matter which we can safely leave to the philosophers to decide.

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